

Economic preferences across generations and family clusters: A large-scale experiment in a developing country*

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Abstract

Our large-scale experiment with 542 families from rural Bangladesh finds substantial intergenerational persistence of economic preferences. Both mothers' and fathers' risk, time and social preferences are significantly (and largely to the same degree) positively correlated with their children's economic preferences, even when controlling for personality traits and socio-economic background. We discuss possible transmission channels and are the first to classify all families into one of two clusters, with either relatively patient, risk-tolerant and pro-social members or relatively impatient, risk averse and spiteful members. Classifications correlate with socio-economic background variables. We find that our results differ from evidence for rich countries.

JEL-classification: C90, D1, D90, D81, D64, J13, J24, J62

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1 Introduction

Economic preferences – such as risk, time and social preferences – are important for a large set of outcomes in life. They have been shown to influence educational achievements (Castillo et al., 2011, 2018; Golsteyn et al., 2014), labor market outcomes (Bandiera et al., 2005, 2010; Heckman et al., 2006; Deming, 2017), financial success (Meier and Sprenger, 2010, 2012; Dohmen et al., 2011), or a subject’s health status (Chabris et al., 2008; Sutter et al., 2013; Schneider and Sutter, 2021). While for a long time a subject’s economic preferences have been considered as a black box about which economists cannot say much, more recently economic research has put particular emphasis on how human cognitive and non-cognitive skills, and in particular how economic preferences are formed (Bisin and Verdier, 2000, Heckman, 2006, Borghans et al., 2006; Kimball et al., 2009; Dohmen et al., 2012; Cigno et al., 2017; Doepke and Zilibotti, 2017; Kosse et al., 2020). Because economic preferences are often assumed to be largely shaped in childhood (Fehr et al., 2008; Kosse et al., 2020) and remain fairly stable from middle to late adolescence onwards (Sutter et al., 2019), the transmission of skills and preferences from parents to children has received ever increasing attention in recent years (Dohmen et al., 2012; Kosse and Pfeiffer, 2012; Bauer et al., 2014; Almas et al., 2016; Alan et al., 2017; Ben-Ner et al., 2017; Campos-Vazquez, 2017; Falk et al., 2021).¹

The rapidly growing literature in economics has typically investigated how parental characteristics affect children’s economic preferences. In most cases, parental economic preferences have not been elicited to explain children’s preferences, but rather the focus has been on factors like parental socio-economic status (see Falk et al., 2021, for a recent example). Moreover, the analysis has typically looked at how parental characteristics determine a specific type of a child’s economic preferences, for instance competitiveness (Almas et al., 2016), social preferences (Bauer et al., 2014), or time and risk preferences (Falk et al., 2021).

None of these papers has focused on how different domains of a subject’s economic preferences relate to each other. Even more so, no study has ever looked at whether it is possible to identify types of whole families with respect to a set of economic preferences of husbands, wives and children, and which factors might determine a family’s type. In order to do so, it is necessary to elicit the economic preferences of full families, meaning of both parents and of children, and then examine the relationships of economic preferences and classify families into different types that share a combination of specific economic preferences. So far, previous

¹ A different strand of literature based in behavioral genetics and economics suggests that large parts of human phenotypes are inheritable, although time, risk and social preferences have not yet been widely studied (see, e.g., Bouchard and McGue, 1981, 2003; DeFries and Fulker, 1985; Ebstein et al., 2010; Le et al., 2010). We discuss in Appendix B how our paper relates to this literature.

research has typically elicited the relation of *one* parent's (typically the mother's) economic preferences to a child's preferences, and moreover only in one domain (see, e.g., Kosse and Pfeiffer, 2012, and Alan et al., 2017, for risk preferences; Bettinger and Slonim, 2007, for time preferences; Ben-Ner et al., 2017, for charitable giving; Cipriani et al., 2013, and Sutter and Untertrifaller, 2020, for public goods provision).

In this paper, we present results from an experiment with 542 families where we elicited economic preferences of 542 pairs of husbands and wives, and of their 907 children, yielding a total of 1,991 individuals as experimental participants. We measure three dimensions of economic preferences – time, risk and social preferences – in a unified and incentivized context, allowing us to examine them at the individual, but also at the family level. Besides the experimental elicitation of economic preferences, we have a rich set of additional controls, such as personality traits, and socio-demographic background data. Based on this data set, we can contribute in several ways to the literature on the formation of economic preferences.

First, we elicit a whole set of economic preferences for husbands *and* wives *and* their children in an incentive compatible way. Having both parents in our sample allows to examine several interesting types of questions. On the one hand, it is possible to study whether the parents' preferences are significantly related to each other.² Our sample originates from Bangladesh, which is a very poor country and has the interesting feature that the vast majority of marriages are arranged by the spouses' families (Ambrus et al., 2010, report that 92% of marriages are arranged in Bangladesh). This means that we can check whether there is assortative mating among spouses in such an environment.³ This is not to be taken for granted as existing evidence suggests that arranged marriages show considerably less assortativity than non-arranged marriages (Dalmia and Lawrence, 2001). On the other hand, we can check whether the economic preferences of mothers and fathers are related to the same degree to their children's preferences. Studies that have elicited only one parent's preferences cannot answer such a question. Given that in a country like Bangladesh most mothers are working at home, and thus spend much more time with children, it is unclear *ex ante* whether children's preferences will be related to both parents' economic preferences to the same extent. Moreover, we can also answer the question whether the relation between the parents' preferences is weaker or stronger than the relation between siblings or between parents and children. Answering these questions is our first contribution and it can inform

² There are a few experimental papers that examine how close husbands' and wives' preferences are. Yet, their focus is to see how individual preferences of spouses are reflected in joint household decisions (on intertemporal choice or risk taking) and they do not relate parental preferences to children's preferences (see Bateman and Munro, 2005; de Palma et al., 2011; Carlsson et al., 2012, 2013).

³ Feedback from conference presentations has revealed that many people believe that arranged marriages are rare. In fact, however, about 50% of marriages worldwide seem to be arranged by parents and spouses' family in one or the other way (O'Brien, 2008).

us about the extent to which intergenerational transmission is stronger than assortativity of parental preferences.

The paper that is most closely related to this aspect of our paper is by Dohmen et al. (2012). They examine in the framework of the German socio-economic panel how risk attitudes and the willingness to trust are related in a representative sample of German families, including both parents and at least one child. Their study differs from ours in several respects, however. First, they do not use any incentives, but rely on hypothetical questions about risk taking and trust. We use monetary incentives for all participants, and as far as we know ours is the first paper to do this for fathers *and* mothers *and* children. Second, their “children” are all above the age of 17 years, with an average age of 25 years, and about 40% of children live no longer together with their parents. In our case, all children are between age 6 and 16, and all of them still live with their parents. Transmission is particularly relevant for younger children as preferences are formed in the early years of life. Moreover, when children live no longer together with their parents, other persons (like partners and peers) might potentially confound the transmission from parents. Third, their study comes from one of the richest countries in the world (Germany), while our participants are from Bangladesh, a very poor country.⁴

Our second main contribution to the literature is that we study how parents’ and children’s economic preferences are related to each other in a developing country. This aspect of our work is novel because previous work has only investigated the intergenerational transmission of economic preferences in rather highly developed and relatively rich countries (see, e.g., Dohmen et al., 2012, and Falk et al., 2021, for Germany; Bauer et al., 2014, for the Czech Republic; Almas et al., 2016, for Norway; Brenoe and Epper, 2018, for Denmark). A large fraction of the world population lives in low-income countries, however,⁵ which suggests that there is a need for scientific evidence about the intergenerational transmission of preferences in poor countries when trying to address ways out of poverty. This feature of our work – having data from a poor country – also allows comparing the data patterns that we find (e.g., how economic preferences are related to IQ or age or education) to what is known from rich and highly developed countries. In other words, we can examine whether established data patterns from rich countries also prevail in a developing country like Bangladesh, which may be relevant for drawing policy conclusions. We also examine whether the relationship between the economic preferences of parents and children is mediated by the socio-economic status of parents. Recent work by Falk et al. (2021) has shown

⁴ In 2016, when we ran the experiments, Bangladesh had a per capita GDP at purchasing power parity of 3,581 international \$, while the US, e.g., had 57,467 \$ (data from <https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?view=chart>).

⁵ See, e.g., the World Bank’s report on extreme poverty (<https://www.worldbank.org/en/topic/poverty/overview>) or poverty facts at <http://www.globalissues.org/article/26/poverty-facts-and-stats> (accessed on 15 June, 2020).

for a very rich country (Germany) that the socio-economic status of parents is an excellent predictor of children's economic preferences. For other rich countries, like Denmark or Norway, the correlations of parental socio-economic status and children's economic preferences have been insignificant, however (Almas et al., 2016; Brenoe and Epper, 2018). Our paper is the first to study with incentivized experiments the relation of parental socio-economic status to children's economic preferences in a poor developing country (with a population of about 165 millions). Since socio-economic status might be used as an indicator to target policy interventions to specific groups in a society, it seems particularly important to examine whether such targeting can work in poor countries where policy interventions might be intended to raise families and their children out of poverty.

Our third, and in our eyes most innovative, contribution is that we establish what we will call "family clusters" with respect to how a set of different economic preferences relates to each other within whole families. Previous research has examined how parental background or one parent's economic preferences relate to single types of children's economic preferences. This means that previous work has, for instance, asked how socio-economic status of parents affects a child's time or risk preferences. Yet, it has not been asked how the different types of preferences relate to each other. Moreover, it has not been investigated whether one can classify whole families, such that by considering the mother's, the father's, plus the children's economic preferences one could find different clusters of families with respect to how the economic preferences of parents and children look like. For instance, it could be the case that parents' economic preferences and children's economic preferences are related for single preferences (like risk, time or social preferences), but beyond these relationships for single preference items there might also be a relation between several items of preferences within the whole family. If we were able to detect such clusters – and we will be – then the next question would be whether we could identify which background characteristics of families are predictive of the cluster to which a family belongs to. This approach will allow us to show how background characteristics of parents relate to whether we can classify a whole family as more patient, more risk tolerant and more prosocial, or rather as impatient, risk averse and antisocial. As far as we can tell, no previous paper has attempted to address such an issue and provide a 360 degree-perspective of economic preferences within families.

We find the following main results. When we first look at parents' preferences, we observe significant correlations between a husband's and his wife's time, risk, and partly also social preferences. Given that most marriages in Bangladesh are arranged by the bride's and groom's families, these significant relationships are noteworthy, as they show a large degree of assortativity

of parents. When we look at the correlations of economic preferences among siblings, these are almost always significant and of comparable magnitude to their parents' correlations.

Looking at the relationship between parents' and children's preferences, we find that both mothers' and fathers' preferences are significantly positively related to their children's economic preferences. In a nutshell, children have fairly similar preferences to their parents'. Interestingly, with only one exception, regression coefficients for mothers and for fathers do not differ from each other, and are practically the same for daughters and sons, suggesting that both parents' preferences are equally important in their relation to their children's economic preferences.

We also explore the question whether single economic preferences – risk, time and social preferences – within families are related to family background, in particular to socio-economic status of parents. Here we observe two important findings. First, household income is neither significantly related to fathers' economic preferences nor to mothers'. The household income *is* related, however, to parents' years of schooling and an encompassing measure of IQ of both mothers and fathers. The latter relationship is expected, but we would also have expected a relation of household income to the parents' economic preferences. Second, socio-economic status of parents is also unrelated to single economic preferences of children as soon as we control for parents' economic preferences (the ability to do so being one of our major design features). Only when we exclude parents' economic preferences, we find a relation of socio-economic status of parents to time preferences and pro-sociality of children (like Falk et al., 2021, have found for Germany). In a series of robustness checks we further investigate potential transmission mechanisms. We consider parenting styles, the degree of assortativity of parents with respect to economic preferences, and the influence of older siblings on younger siblings, also controlling for potential peer effects within villages. While this analysis reveals some influence of these factors, we still find a strong relation of parental economic preferences to children's economic preferences even when considering these other potential transmission mechanisms.

When we extend our analysis to take into account all three economic preferences simultaneously and search for family clusters with respect to a specific combination of parents' and children's preferences, we find the following novel results. First, we see that the three economic preferences are related in very specific ways: spiteful subjects (who minimize a recipient's earnings in a series of four allocation games) are also relatively impatient and risk averse. On the contrary, there is a second type of subjects who are relatively patient, risk tolerant and non-spiteful. Importantly, these patterns can be found for both parents and children, and, most importantly, within whole families. In fact, our estimations identify two prototypical clusters of families: one cluster has relatively more spiteful, impatient and risk averse family members, and the other cluster is characterized by relatively more patient, risk tolerant and non-spiteful family

members. In a final step of our analysis we find that the socio-economic background of parents is significantly related to the cluster to which a family is assigned to. Families with relatively higher household income and a larger number of household members are significantly more likely to be classified into the cluster with more patient, risk-tolerant and non-spiteful family members.

Our paper proceeds as follows. In section 2, we introduce our sample of 542 families (with 1,991 members), some background information about Bangladesh and our study design. In section 3, we look separately at risk, time and social preferences and the correlations for single preferences within families, controlling for a host of background variables and personality characteristics. Section 4 discusses plausible transmission mechanisms, including assortativity of parents or the influence of older siblings. Section 5 then investigates the interrelationship between risk, time and social preferences, first within subjects (separately for parents and children) and then within families, identifying clusters of families with specific patterns of economic preferences and regressing cluster membership on parental background. Section 6 provides a short discussion of how our results from a developing country differ from data patterns established in rich and highly developed countries. Section 7 concludes the paper.

2 Data collection and experimental procedures

2.1 Sample selection and characteristics

Our data were collected in four rural districts of Bangladesh (Chandpur, Gopalganj, Netrokona, and Sunamgonj). Those districts represent four major administration divisions of the country and were originally selected to study the challenges arising from arsenic poisoning contamination in ground water in Bangladesh for labor supply, productivity and well-being.⁶ For the latter project, representative survey data and extensive information about cognitive and non-cognitive skills were collected, that were then complemented for this paper with experimental data. The sequence of waves for data collection are explained in the sequel.

For the project on arsenic poisoning (Chowdhury et al., 2015), 150 villages from the four districts and 30 households within each village were randomly selected for inclusion in the study. A detailed household survey with these households was run between March and May 2014. Due to budgetary constraints, only one third of the households in each village was randomly selected for participation in an additional survey wave in October and November 2014. A comparison of this sub-sample of 10 households per village to the full sample of 30 households does not show

⁶ See Chowdhury et al. (2015) for a detailed discussion on the survey method. Briefly, it is representative of the rural area of the four districts, and the sample households are similar to the rest of the rural households in terms of their observable characteristics.

any meaningful differences in the observed household characteristics, however. This second wave was intended to measure the cognitive skills of both parents and their children. For the current paper, we are only interested in the subset of households that had at least one child aged between six and 16 years (at the time of running the experiments). This subset contains 1,000 households⁷ of which we managed to survey both parents, i.e., mother plus father, and their children in 732 households in October and November 2014.⁸ Most importantly, and this is the key wave for this paper, from March to May 2016, we employed a final wave in which we elicited economic preferences of children and their parents through economic experiments and collected data on non-cognitive skills. The combination of all three waves constitutes the basis for this paper, and it includes 542 families with complete data from all waves.

In the Appendix we compare in Table A.2 this final set of 542 families, first, to the set of 190 families for which we don't have experimental measures (i.e., who participated in wave two, but not in wave three) and find that both sets are very similar to each other (column 7). Only with respect to parents' age and household income, we find a significant difference. With respect to other important variables (like education of parents or household size) we do not observe any significant differences between both sets of households. Second, we compare our final set of 542 families to the larger set of 458 families who were intended to be included in wave two and had at least one child in the eligible age range. Table A.2 in the Appendix shows that in comparison to the latter set, our 542 families are statistically indistinguishable in background characteristics with respect to parents' age and education, and household size (column 8). Only for household income per capita, we note that our 542 families are poorer than the other 458 families that were intended for inclusion in wave two (but not in wave three). This means that within the poor country that we study (and which is a novelty of our paper), we have a comparatively poor sample of families, emphasizing our focus on how the transmission of economic preferences looks like within poor families. Overall, we see little attrition through the course of collecting data for this paper.⁹

⁷ In Table A.1 in the Appendix we compare these 1,000 households that have children (that are a subset of the 1,500 households interviewed in the wave in October and November 2014) with the other households not having children (or not in the eligible age range) and the remaining 3,500 households in the dataset of Chowdhury et al. (2015). Both sets differ (in small absolute amounts) in the following variables – yet in an expected way since we focus here on the 1,000 households *with* children (a condition that not all other households satisfy): Fathers in our 1,000 households are slightly older (1.2 years), parents less educated (0.8 years less schooling, which fits the negative relation between age and schooling in Bangladesh), households are larger (1.1 additional member), and have slightly lower per-capita income (due to a larger household size).

⁸ We lost households between survey waves mostly due to temporary migration of one or more members during the survey period.

⁹ In Table A.3 in the Appendix we take potential sampling attrition concerns into account by presenting our main results (that we present in section 3) under a specification that applies inverse probability weighting. Our results are robust to such a specification which should alleviate potential attrition concerns.

In the following, we will work with the set of 542 families for which we have all data, including the experimental measurement of time, risk and social preferences for mothers, fathers and children in the age bracket of six to 16 years. For the experiment, we started with the inclusion of children at age 6 because we were afraid that children younger than that age could have too much difficulties in understanding all experiments. In households with two or fewer children in the respective age bracket, all children were interviewed. When a family had more than two eligible children, only the youngest and the oldest child in this age bracket were interviewed. Given this procedure, we have data for 1,991 family members, including 907 children, 542 mothers and 542 fathers. Of those 542 families, we have 177 with only one child included, and 365 with two children.

All data collection took place at household premises. Trained enumerators (experimenters) from a professional survey firm visited each household, conducted the interviews and experiments with parents and children on a one-to-one basis.¹⁰ Each participant was interviewed in a separate room or venue and at the same time as the other household members. This procedure of independent simultaneous responses was implemented in order to retain anonymity of decisions and to avoid any kind of influence from one household member on another.

Table 1 presents summary statistics of our sample. It shows that we have almost an equal fraction of boys and girls (with 51.0% girls). On average, children are over twelve years old (at the time of the experiment), and have had four years of schooling already, with 93.% of children still attending school. On average, they have one older brother and one older sister (who are not always still living in the same household), and 0.6 younger brothers and 0.6 younger sisters. Their fathers and mothers have an average age of 47 years, respectively 38 years, and about three years of schooling. The latter means that the parents are typically less educated than their children. In 15.1% of households, at least one grandparent lives with the family.

Table 1 about here

As indicators for parental socio-economic status and family environment, we collected parents' occupation, household income, land ownership, and their education. About 51% of our sample is illiterate, which aligns well with a 2015 illiteracy rate of 38.5% in Bangladesh (CIA World Factbook, 2015). Eight percent of the sample has at least a secondary school certificate; this is in line with the Bangladesh Household Income and Expenditure Survey's finding of 8.9%

¹⁰ This professional survey firm was independently contracted for data collection and managed the whole process, including recruitment and training of enumerators, survey logistics, and data collection. Two of the authors attended all training sessions, and pilot phases.

for rural areas (Bangladesh Bureau of Statistics, 2011). Table A.4 in the Appendix reports the distribution of years of schooling for mothers and fathers. It seems that mothers are somewhat more educated than fathers; 47% of mothers and 55% of fathers have no schooling at all.

The primary occupation of the majority of fathers is agricultural worker or farmer (52%), while 95% of mothers work as housewife in their primary occupation. In 2016, the average annual total *household* income in our sample amounted to 113,967 Taka (about 1,400 USD), which was very similar to the 2010 rural national household average of 115,776 Taka (Bangladesh Bureau of Statistics, 2011), implying that with respect to household income our sample is a good representative of the rural areas in Bangladesh.

In our study, we use household income aggregated across all income sources and across all household members. In order to collect all the information necessary to measure household income, we have utilized the relevant survey modules used by the Bangladesh Bureau of Statistics (BBS) in its periodical Household Income and Expenditure Survey (HIES).¹¹ The HIES is a locally adapted version of the World Bank's Living Standard Measurement Survey (LSMS) which is regularly used in about 100 developing countries to measure national and regional poverty, and well accepted in the scientific literature.¹² Given the dominance of the informal sector, self-employment, and household enterprises where multiple members contribute through unpaid labor, the aggregation of income across sources and members captures income much more comprehensively than using income of household heads or spouses from the labor market alone. A per capita measure is obtained by dividing total household income through the number of members in a household (including parents, children, grandparents and other relatives in case they are present in a given household).¹³ In 2016, the average household income per capita per month was 1,640 Taka (about 20 USD).

2.2 Experimental measurement of time, risk and social preferences

The experiments were conducted between March and May 2016. Male administrators dealt with boys and fathers, female administrators with girls and mothers, and each participant made his or her choices in a separate room or area. The experiments elicited a) time preferences, b) risk preferences, and c) social preferences, where the order was randomized at the individual level. All experiments were incentivized, but only one of the three experiments was randomly chosen for

¹¹ The survey modules and reports are available online in the Report of the Household Income and Expenditure Survey 2010. See <http://203.112.218.65:8008/WebTestApplication/userfiles/Image/LatestReports/HIES-10.pdf> (accessed 28 July 2021).

¹² See, for example, Chen and Ravallion (2001) or Besley and Burgess (2003). The poverty measure used in the UN's Millennium Development Goals applied the LSMS survey to calculate poverty across countries.

¹³ Our results on the influence of household income remain qualitatively unchanged if we count children as less than one adult when calculating the per capita household income.

actual payment at the very end of the experimental session. Payments related to risk and social preferences were made immediately, while the payments for time preferences were executed at the time indicated in the choice.¹⁴ The incentives were scaled contingent on the participant's age. For children the payment was roughly proportional to the average weekly allowance for a given age. The experimental instructions and Table A.5 in the Appendix include the age-specific exchange rates of experimental tokens into the local currency (Taka).

Time preferences: Here we used a simple choice list-approach where participants faced a tradeoff between a sooner, but smaller, reward and a later, but larger, reward (see, e.g., Bauer et al., 2012, or Almas et al., 2016, for similar approaches). The choice lists that we used were kept simple in order to make it easy for children to understand the choice options. Panel A of Table 2 presents the six choices that children had to make and the 18 choices for parents. Both for children and parents we designed three sets of choices. The earliest payment was always the day after the experiment (“tomorrow”) and the later payment was either paid between three weeks and one year after the earlier payments. Both for children and parents we used two choice sets where the delay was three months. For children we had a third set with a delay of only three weeks (to keep the waiting time shorter for them), and for parents we had one set with a delay of one year. The order with which participants made their decisions was randomized on the level of the choice set. If time preferences were selected for payment, one out of the six (18) decisions of children (parents) was then randomly chosen for payment, and the payment was delivered at the specified date to the recipient. For the analysis of time preferences, we use the *total number of patient choices*, which is a simple count of how often the larger, but later, reward was chosen in all six (18) choices.¹⁵

Risk preferences: Here we followed the design created by Binswanger (1980) that has often been used in rural settings in developing countries (e.g., Bauer et al., 2012). Participants had to choose one out of six gambles that yielded either a high or a low payoff with equal probability. The low payoff was decreasing and the high payoff was increasing for each successive gamble. Panel B of Table 2 shows the six gambles and the payoffs that were age-contingent. Unfortunately,

¹⁴ Payments were either executed by NGOs that we worked with or by helpers of the professional survey firm. Given that those NGOs are locally based and have been working in those communities for years, mistrust of not getting paid in case of delayed payment should not be of any concern. However, as we see no difference in intertemporal choices made when the payment was executed by the NGO or by the survey firm, credibility seems to have been also unproblematic with the survey firm. Also note that in each choice there was some uncertainty involved because the earliest payment date in the intertemporal choice task was always the day after the experiment.

¹⁵ When looking at time preferences, we can, in principle, also define an indicator variable for *time consistency*. This variable gets the value of 1 if a participant's choices are identical for the two choice sets with three months delay (i.e., choice sets 2 and 3 for children, and choice sets 1 and 2 for parents; see Table 2), and zero otherwise. For succinctness, we relegate the analysis of time consistency to the Appendix where we show in Table A.6 that there is a significantly positive relationship of fathers being time consistent on children's likelihood to be time consistent, which matches our general insights that parents' preferences are strongly related to their children's preferences.

due to some miscommunication between the experiment administrators in the field and us, we have collected risk preferences only for half of the children (but still for all parents). In Table A.7 in the Appendix we present descriptive data for the households in which we collected risk preferences of children, and those in which we did not. There are no significant differences between both sets of households (except for a difference in the number of elder sisters). For risk preferences, we used the *gamble number picked* as an outcome measure, a number from 1 to 6. Higher numbers are associated with a higher willingness to take risks.

Table 2 and 3 about here

Social preferences: Here we used the experimental protocol implemented in Bauer et al. (2014) who had extended Fehr et al. (2008). Each participant had to make four choices between two options each. Each option describes an allocation of x units of rewards to the decision maker and y units to an anonymous recipient (of same gender and of roughly same age).¹⁶ In each of the four choices, one allocation (x,y) was always the allocation $(1,1)$, while the alternative allocation was designed to classify different social preference types. The four choices are illustrated in Panel C of Table 2. From the four choices in Table 2, one can create four mutually exclusive social preference types (following Bauer et al., 2014).¹⁷ These types – and the according choice patterns – are shown in Table 3. The types are defined as follows: (i) *altruistic* if subjects maximize the recipient’s payoff in all four choices; (ii) *egalitarian* if they always minimize the difference in payoffs for themselves and the recipient, which means to choose always the allocation $(1,1)$; (iii) *spiteful* if they always minimize the recipient’s payoffs; and (iv) *selfish* if they maximize their own payoffs in the first and the fourth choice (the payoff of the decision maker is the same in both options of the other two choices). Note that these types are based on seven out of 16 different choice patterns in the four games. The other nine patterns have no straightforward interpretation. Yet, more than 75% of subjects can be classified as either altruistic, egalitarian, spiteful or selfish (which is a similar fraction as in Fehr et al., 2008, and Bauer et al., 2014). We take the remaining patterns (covering less than 25%) as omitted category.

Before starting any of the three experimental parts, participants had to answer control questions to check for proper understanding (see part B in the Appendix). Since the explanation of the experiment, the choice options and the possible consequences was done in great detail and on a one-to-one basis, we have only a few participants who had problems in understanding. More

¹⁶ Recipients were from villages outside of our sample villages. They were similar to the experimental participants, but not known or connected to the participants in any way.

¹⁷ Note that the mutually exclusive, and binary, set of four social preferences types is different from our measures of risk and time preferences where we measure whether someone is more or less risk tolerant or patient.

precisely, 0.68% (0.18%) of children (parents) did not understand the time preference experiment; 3.00% (1.02%) of children (parents) did not understand the risk preference experiment; and 0.95% (0.36%) of children (parents) did not understand the social preference experiment. In our regression analysis, we have excluded them when relevant.¹⁸

2.3 Measurement of cognitive and non-cognitive skills as control variables

We included the measurement of cognitive and non-cognitive skills as control variables for the formation of economic preferences within families.

Measures of cognitive skills: We used a locally adapted version of the Wechsler Intelligence Scale for Children (WISC, version IV; Wechsler, 2003) and the Wechsler Adult Intelligence Scale (WAIS)¹⁹ to measure cognitive skills. In the following, we are going to use a standardized composite measure of full-scale IQ (FSIQ).²⁰ Summary statistics of children's and parents' FSIQ are presented in Table A.8 in the Appendix.

Measures of non-cognitive skills: Here we measured personality traits and locus of control. We used a 10-item BIG 5 questionnaire for children aged 6 to 11. For children aged 12 or above and for mothers and fathers we used a 15-item questionnaire, derived from John et al. (1991) and evaluated in Gerlitz and Schupp (2005). For the children aged 6 to 11, the items were answered by the main caretaker (Weinert et al, 2007), which was almost always the mother, while all older participants answered for themselves. Five personality traits – extraversion, conscientiousness, openness, agreeableness, and neuroticism – were constructed from the 10 (15) items. For the 15 (10) items questionnaire, each personality trait is an average of three (two) items. Hence, resultant traits are comparable. Their summary statistics are shown in Table A.8 in the Appendix. In addition to personality traits we also measured locus of control (Rotter, 1966; Lefcourt, 1991) which is an indicator of subjects' beliefs to what extent they have control over the outcome of events in their life. We followed Kosse et al. (2020) in our measurement approach, but relegate details to Appendix B (see the notes to the experimental instructions) since this aspect is not central to our research question.

¹⁸ For example, in analyzing time preferences, we excluded parents and children who did not understand the time preference task completely. However, in analyzing time preferences, we did not exclude other parents or children who did not understand another experiment, for example the one on risk preferences. Note that inclusion of subjects with difficulties in understanding would not change any of the qualitative results reported in this paper.

¹⁹ We worked with local academics with expertise in the adaptation and use of WISC version IV. In particular, Salim Hossain from the Department of Psychology, Dhaka University, and his team have adapted both WISC and WAIS – as well as the questionnaire about locus of control (see below) – to the local context for us.

²⁰ This composite measure can be separated into four indices, verbal comprehension index, perceptual reasoning index, working memory index, and processing speed index. Each of the four indices is significantly related at the 1%-level to FSIQ (with correlation coefficients ranging from 0.75 to 0.91). Using the four separate indices instead of FSIQ would not change any of our main results.

3 Analysis of single preferences at the individual level

In this section we study time, risk, and social preferences separately. We start by presenting a descriptive overview of the experimental choices. Table 4 shows the means and corresponding standard deviations for the different measures of time, risk and social preferences. The upper panel presents data for parents, first combining husbands and wives, and then separately. The lower panel displays data for children, again first combined and then separately for daughters and sons. Note that Table 4 does not consider family membership, but presents averages across all families. In the aggregate, we note that husbands and wives have significantly different time preferences, and partly social preferences, but no differences in risk preferences. Daughters and sons, however, show no significant difference in any of our measures. Recall that the relative frequencies of the four social preference types need not add up to one, as the four games allow for more choice patterns than are captured by the definition of altruistic, egalitarian, spiteful or selfish types (Bauer et al., 2014). Nevertheless, the four types capture more than 75% of subjects. It is also noteworthy that our time preference experiment allows for inconsistent choices. By the latter we refer to cases where a subject is willing to wait for a future payoff of X , but not for an even larger payoff $Y > X$ (holding the earlier payoff constant). It is reassuring to note that among parents we do not observe any such inconsistent choices.²¹ For children, this happens only in 4.5% of cases. This fraction is comparable to the magnitudes reported in Sutter et al. (2013) for 10-18 years old.

Table 4 about here

3.1 Correlations of single economic preferences within families

Table 5 examines correlations of economic preferences within families from three perspectives. It presents correlations (i) among spouses (column (1)), (ii) between siblings (column (2)), and (iii) between parents and children. In the latter case, column (3) shows the correlations between mothers and children, and column (4) between fathers and children.

Table 5 about here

From column (1) we see that husbands' and wives' preferences are significantly positively correlated most of the time, i.e., for risk and time preferences, and partly for social preferences.

²¹ Note that the inconsistency we are referring to here is different from time consistency as discussed in footnote 14 and Table A.6 in the Appendix.

Recall that marriages in rural Bangladesh are in an overwhelming majority of cases arranged by the bride's and the groom's families (Ambrus et al., 2010). It is, therefore, not straightforward to expect similar preferences of husbands and wives, unless particular types of preferences are part of attributes sought in the marriages, whether or not the parents of the bride and the groom arrange the marriages. When comparing the correlations among spouses in column (1) to those between siblings in column (2), we note that they are of comparable magnitudes. Columns (3) and (4) address the correlations between mothers and children, respectively fathers and children. Again, we observe significant correlations in almost all cases, and, by and large, the coefficients are comparable in both columns, indicating that mothers' and fathers' economic preferences are related to their children's preferences to a similar degree. This is noteworthy because mothers spend much more time at home than fathers, for which reason one could naively expect mothers to have a tighter relationship if spending time would predominantly shape the relationships.

3.2 Assortativity of parents – Regression analyses

In Panel A of Table 6, we look closer at how both parents' economic preferences are related to each other, now controlling for a host of additional variables. For this purpose, we regress a husband's economic preference on his wife's corresponding preference. The first row in Table 6 basically confirms the results of column (1) in Table 5, despite controlling for a large number of background variables, including socio-economic status, cognitive abilities and personality traits. With respect to both risk and time preferences, there is a positive and significant relationship of "wife's preference" to her husband's preference. The relation in the case of social preferences is only significant for spitefulness, but not for the other social preference types. The significant relationships between husband's and wife's preferences raise the question whether they could have been caused by selection of similar partners (even in case of arranged marriages) or are a result of post-marriage convergence. Unfortunately, we do not have data on the length of the marriage. Yet, data from rural Bangladesh by Ambrus et al. (2010) show that the correlation coefficient between a woman's year of marriage (age at marriage) and her year of birth (age) is 0.965. This allows us to take the "age of respondent" as a reasonable proxy for the length of marriage. The insignificance of this variable in Table 6 suggests that post-marriage convergence is most likely not a main factor, but rather that the families of bride and groom seem to look for a match that includes similarities in economic preferences.²²

²² Please note, however, that given that all of our families have children who are at least 6 years old, spouses have been staying together for at least seven years. This means that, in principle, convergence of preferences might have occurred already during these early years of a marriage, implying that we cannot identify in detail whether selection or post-marriage convergence makes parents' preferences similar. Results in Carlsson et al. (2012, 2013),

Table 6 about here

Looking at the other control variables in Table 6 we only highlight a few noteworthy findings. With one exception, a husband's years of schooling are not significantly related to his economic preferences. Household income per capita is also unrelated to risk and time preferences, but somewhat related to social preferences. Taken together, this means that socio-economic status plays only a minor role for husband's economic preferences when the latter are considered separately. The BIG-5 personality traits show a relationship to social preferences. More conscientious husbands are more likely to be altruistic and less likely to be selfish, and more agreeable husbands are less often spiteful.

Interestingly, IQ is weakly significantly negatively related to patience. While one should not overemphasize a single, weakly significant result, below we will also see such a negative relationship between IQ and patience for the 907 children in our sample. We were surprised by this result initially, given that for relatively rich countries the relationship between IQ and patience has often been shown to be positive (e.g., Mischel and Metzner, 1962, Funder and Block, 1989, Dohmen et al., 2010, Falk et al., 2021). However, such a positive relationship does not seem to be a universal phenomenon, as we discuss in more detail in Section 6 below where we highlight differences in data patterns between our sample from a poor country and previous evidence from rich countries.

Panel B of Table 6 presents the same investigations for wives as panel A did for husbands and shows the same general patterns of results. Here we include the husband's preferences on the right-hand side of the equation. Like for husbands, we confirm the previous results from column (1) in Table 5, such that there is a significant positive relationship between spouses' preferences with respect to risk and time preferences and spitefulness. Household income per capita is not in a single case significantly related to the wife's preferences. Years of schooling – another indicator of socio-economic status – is related to time preference and risk aversion. Taking panels A and B of Table 6 together, we see that socio-economic status of parents has little relationship to their economic preferences when we investigate each preference domain separately.

3.3 Relation between children's and parents' preferences – Regression analyses

however, fail to report any post-marriage convergence in their sample of Chinese couples and their risk and time preferences, which supports our interpretation that post-marriage convergence is an unlikely explanation.

Table 7 shows the association between children's and each parent's preferences in order to study in more detail how economic preferences are linked within families and potentially transmitted across generations. OLS coefficients²³ are reported for risk and time preferences in columns (1) and (2), and probit marginal effects for social preferences in columns (3) to (6). All the preference measures for time, risk and social preferences of children are positively and significantly associated with at least one parent's preference. In fact, in the majority of cases there is a significant relation to both mothers and fathers, thus confirming the correlation analysis shown in columns (3) and (4) of Table 5 above. In Table A.9 in the Appendix, we show that the relation of parents' and children's preferences remains practically the same if we drop all control variables and only regress children's preferences on parents' preferences. In additional regressions not shown here, we also find that the mother's (the father's) preferences remain significant if the other parent's preferences were excluded from the regressions shown in Table 7. Yet, one strength of our design is to have both parents' economic preferences, for which reason we always include both mothers' and fathers' preferences in the following analyses.

When comparing the estimated coefficients for mothers and fathers, there is only a single measure for which our regressions in Table 7 indicate a significant difference between these coefficients, and this is the case for spitefulness, where mothers' coefficient is significantly larger than fathers'. In all other cases, the relationship to the child's preferences is practically the same for mothers and for fathers (see the test statistics at the bottom of Table 7)²⁴, and this relationship does not depend on the gender of the child, as we show in Table A.10 in the Appendix. Hence, it is not the case that mothers have a stronger relation to daughters, or fathers to sons, with respect to their economic preferences.

In Table 7, we also show the relation of other covariates to children's economic preferences. Age and gender are largely insignificant (except that boys are less patient and older children take less risk). Regarding personality traits, we note that agreeableness and openness are related to social preferences. Children's full-scale IQ is related to economic preferences in several dimensions. Children with higher IQ are more egalitarian and less selfish, but also less patient. Somewhat similarly, we had already seen a negative relationship between years of schooling and patience for parents. It seems that higher IQ or more schooling are not positively linked to patience, as one might expect from evidence gathered in developed countries. We discuss this finding in Section 6 in more detail.

²³ Using ordered probit estimates yields qualitatively the same results.

²⁴ Based on the means and standard deviations of all six preferences (time, risk, and social preferences) and given the sample size (see Table 4), our experimental data is able to detect a 0.1 standard deviation size effect with more than 0.8 power.

Table 7 about here

Turning to variables referring to household characteristics, we find that household size is systematically related to children’s social preferences. The larger the number of household members, the less likely children are egalitarian and altruistic and the more likely selfish.²⁵ Interestingly, the per-capita income of households does not have any significant relationship with single economic preferences of children, and also parents’ education (years of schooling) is insignificant.²⁶

Overall, Table 7 shows that socio-economic status of parents is practically unrelated to the economic preferences of children when we consider each preference separately. This may look surprising, given the results in Falk et al. (2021) who have found that higher socio-economic status of (German) parents is related to higher patience, risk tolerance and prosociality of children. Recall, however, that Falk et al. (2021) do not have any data on parents’ preferences. If we exclude the parents’ preferences from the regressions in our Table 7, income or schooling of parents turns significant for at least patience and selfishness, as we show in Tables A.11 to A.16 in the Appendix. The latter results are consistent with Falk et al. (2021), showing that it makes a difference whether one can control for parental preferences or not to see whether and how socio-economic status of parents is linked to single economic preferences of children.²⁷ In the following section we examine why parents’ and children’s economic preferences might be related to each other. In other words, we look into possible transmission channels.

4 Channels of intergenerational transmission

²⁵ While we do not look specifically at single children (who have no siblings), we note that Fehr et al. (2008) find that single children (who live almost by definition in smaller households than children with siblings) are more egalitarian and altruistic than children with siblings. Our results on the effects of household size mirror their findings (from Switzerland).

²⁶ Household income is not significantly related to parents’ preferences. In additional regressions we can show that an interaction term of household income with parental preferences is always insignificant (for both parents and for all six preferences considered in Table 7). Interaction of parental preferences with parents’ years of schooling is only once (out of twelve cases) significant at the 10%-level, and insignificant in all other cases.

²⁷ Given that we test parents’ preferences on children’s preferences multiple times, we have controlled for multiple hypotheses testing (MHT), implementing the Romano-Wolf correction in STATA (Clarke et al., 2019). The Romano-Wolf correction asymptotically controls the familywise error rate, and given that it takes into account the dependence structure of the test statistics by resampling from the original data, it is considerably more powerful than other MHT procedures such as Bonferroni (Clarke et al. 2019). As can be seen in Table A.17 in the Appendix, our reported p -values and Romano-Wolf p -values are very similar in all cases to those reported in Table 7. In the Appendix, we show in Tables A.18 to A.20 that also the ensuing analyses in Tables 8 to 10 of the main paper are robust to multiple hypothesis testing.

In this section, we look at several factors that one might subsume under the notion of environmental factors. More precisely we first analyze whether parenting styles of parents can explain children's economic preferences, so that the way in which parents treat and raise their children affects the children's preferences. Second, we look into whether parents who have similar economic preferences have a different relation to their children's economic preferences than parents with relatively dissimilar economic preferences. This is to examine whether it matters if parents are like-minded or not. Third, we control for an indirect influence of parents working through older siblings. As a robustness check, we finally analyze whether our results are robust to controlling for peer effects within one's village.

Parenting styles. The questions to assess the parenting style were taken from the Panel Analysis of Intimate Relationships and Family Dynamics (pairfam; Wendt et. al., 2011).²⁸ There are 18 items in the questionnaire (see the end of Appendix C) that can be used to score a family on each of six different parenting styles: Emotional warmth, monitoring, inconsistent parenting, negative communication, psychological control, and strict control.²⁹ We then used a principal components analysis (PCA) to classify households with respect to the extent of a positive and negative parenting style. We use the PCA-index for both styles as explanatory variables in Table 8 (that is based on Table 7, but adds parenting styles as controls).³⁰ We see that neither positive nor negative parenting is significantly related to children's preferences, nor are they jointly significant (as can be seen in the last row of Table 8). While it seems that parenting styles are unimportant for the economic preferences of children, their inclusion in Table 8 leaves the coefficients and their significance for parents' preferences (first two rows of Table 8) largely unaffected.

Table 8 about here

Assortativity of parents. To address the importance of parents' assortativity on their children's economic preferences, we follow Dohmen et al.'s (2012) approach and categorize parents into two categories – homogeneous parents where the absolute difference in preferences between husband and wife is less than one standard deviation of the overall sample, and heterogeneous parents if the absolute difference is greater than or equal to one standard deviation.

²⁸ Parenting styles were surveyed after the experiments, and we obtained data for 459 out of our full sample of 544 households.

²⁹ Due to a translation error we had to drop the questions related to inconsistent parenting.

³⁰ In additional regressions we can show that using standardized values of the different styles (emotional warmth, monitoring, negative communication, psychological control, and strict control) separately also yields insignificant results for parenting styles (both for individual styles and for their joint significance). It is also the case that parenting styles are unrelated to parents' economic preferences (see Table A.21 in the Appendix).

As a first step, we predict each adult's preference based on the covariates that we employed to explain preferences of children. One exception is that for parents we do not have their parents' preference data. For spitefulness, the absolute difference is kept at 0.5 standard deviations in order to keep the two groups at reasonable sample sizes. Then we repeat the main regressions presented in Table 7 by taking into account this separation into homogeneous and heterogeneous parents. One might imagine that homogeneous parents might give the same example to their children (by having very similar economic preferences), for which reason it could be that those parents' preferences have a stronger relationship to their children's economic preferences.

We present the results in Table 9 which contains – in comparison to Table 7 – three additional explanatory variables: a dummy for whether a child's parents are classified as homogeneous (=1) and two interaction terms where we interact the mother's, respectively the father's, economic preference with the dummy for homogeneous parents. Including these additional explanatory variables implies that the main variables "father's preference" and "mother's preference" measure the relationship of fathers and mothers from heterogeneous families with the child's preferences. The influence of mothers and fathers from homogeneous families is shown in the post-estimation tests at the bottom of Table 9.

From Table 9 we note that fathers' and mothers' preferences in heterogeneous families are significantly related to their children's time preferences and some of the social preference types, but not for risk preferences. So, even if parents have comparatively divergent economic preferences, we mostly see a significant relation to their children's economic preferences. The dummy for parents' homogeneity is only weakly significant for selfish social preferences, but has no significant coefficient in all other cases. If we look at homogeneous families, where fathers' and mothers' preferences are fairly similar, we note from the post-estimation tests at the bottom of the table that they are significant mainly for social preference types, but not for time preferences and risk preferences. Overall, the evidence suggests that the degree of parents' assortativity with respect to their own economic preferences (dichotomized here as homogeneous or heterogeneous) does not matter much for the relation to their children's preferences. So, neither parenting styles nor the assortativity of parents seem to be particularly noteworthy factors for explaining the similarity of parents' and children's preferences.

Table 9 about here

The role of older siblings. Within families, it is natural to assume that siblings will have an influence on each other as well, meaning that it is not only parents who may shape children's preferences within families. To look at the role of siblings, we make use of the data from the 367

families where we interviewed two children. We want to look specifically at the potential influence of older siblings' preferences on younger siblings' preferences. We do this in two steps: first, using the specification of Table 7, we regress the older sibling's preference on parents' preferences and estimate the residuals. This way we control for the parents' relation to the older sibling's preferences. Second, we use the older sibling's residuals as explanatory variables in estimating the younger sibling's preferences. Note that all other variables, including parental preferences, remain unchanged. Table 10 shows the results. We note that the variables for the father's preferences turn insignificant almost in all columns when controlling for the older sibling's preferences, but the mother's preference remains significant (in almost all columns). The older sibling's preferences are significantly related to the younger sibling's time and risk preferences, but there is no relation to social preferences. In a sense, through growing up in the same household, the older siblings may transmit the parental preferences also to the younger siblings because the older siblings are also influenced by parents.

Table 10 about here

Controlling for peer preferences. As a final aspect of a child's environment, we check whether the correlations between parents' and children's preferences remain robust when controlling for the potential influence of peers within villages. Since most of our families' social life takes place within their villages³¹, it is natural to assume that preferences of surrounding villagers might play an important role and thus influence the transmission of preferences within families. Recall from Section 2 that our children live in 150 different villages in rural areas of Bangladesh. We treat each village as a separate community and construct the average village preference for each preference type. To do so, we take the average of all villagers, including both children and parents. However, to avoid the reflection problem, we exclude a child's and his or her parents' preferences in calculating the village average (similar to Dohmen et al., 2012).³² As expected, Table 11 shows that children's preferences are highly positively associated with the average preference in the village, indicating a significant relation to their peers. Yet, even when we control for peer effects within villages, the positive association observed between children's

³¹ As indicated earlier, 96% of mothers work as housewives, meaning that they stay within their village. Concerning fathers, 53% work as farmers and 33% are self-employed in non-agriculture. Both types of activities are done within the village, while the only remaining relevant occupations (non-agricultural worker (6%) and professional (6%)) require some travel outside the village. So, the large majority of parents works and stays within the village, and so do children (who usually attend the village's school).

³² While most of our dependent variables are binary, the village average is continuous (for example, which proportion of villagers shows egalitarian preferences). The actual number of villages in our final sample is 122.

and their parents' preferences still remains significant. For mothers there is hardly any change (compare Table 11 to Table 7), while for fathers we see four significant relations.

Table 11 about here

In sum, this section has shown that looking at possible transmission factors by considering parents (with respect to parenting style and assortativity of preferences) and siblings has revealed a persistent relationship between parents' economic preferences and their children's preferences. This robustness might hint at a significant role of genetics for this intergenerational transmission of economic preferences. Unfortunately, we do not have any genetic data to analyze, but in Appendix B we provide an econometric exercise that discusses what our data might imply with respect to the genetic transmission of preferences. There we show that our data are not consistent with a story of pure genetic transmission.

5 Joint analysis of risk, time and social preferences: Identifying family clusters

In the previous sections we have looked at each measure of economic preferences separately. In the following, we, first, study the relationships of different economic preferences *within individuals*. Previous work that has linked theoretically two (out of our three) different preference domains each (e.g., Halevy, 2013; Saito, 2013; Epper and Fehr-Duda, 2018; Kölle and Wenner, 2021) suggests that we can expect significant relationships across all domains studied here, and also for fathers, mothers, and children. However, this has not been investigated so far. Second, we will examine whether we can identify different *clusters of families* with respect to the interrelationship of economic preferences of fathers, mothers, and children, and whether we can identify socio-economic and demographic determinants of the assignment to a particular cluster.

5.1 Correlations across preference domains

We start with Table 12 and present the raw correlations of our six measures of economic preferences for husbands, wives, and children. All three panels show an interesting pattern of how the three types of economic preferences are related to each other within individuals. In particular, they reveal that more patient individuals are typically more risk tolerant (significant for wives and children) and that both risk and time preferences are also related to social preferences. Spiteful subjects (who minimize the recipient's payoffs in the four social preference tasks) are less patient and less risk taking. In other words, spiteful individuals are typically relatively impatient and risk

averse. For children, the latter direction of the relationship is identical, albeit statistically insignificant for risk aversion. Being classified as a selfish person is positively related to patience and risk taking for all family members. Being egalitarian or altruistic – the least frequent social preference types (see Table 4) – is rarely significantly related to risk and time preferences. The unclassified social preference types (see bottom row in each panel of Table 12) are negatively correlated to the four defined social preference types (as one would expect by definition), but hardly ever related to risk preferences.

Table 12 about here

Overall, Table 12 shows that within individuals, our measures for three different domains of economic preferences are related in a consistent manner for husbands, wives, and children. This pattern raises the question whether families can be systematically categorized into clusters. We investigate this conjecture through the means of a cluster analysis of our data on the family level.

5.2 Identifying family clusters

Albeit rarely used in economics, cluster analysis is a suitable tool for our approach. In a nutshell, cluster analysis considers the set of economic preferences of all family members and then aims to find groups of families that are similar to each other in terms of economic preferences of all family members, but differ considerably from other groups of families with different combinations of risk, time and social preferences of all family members. There is no reason to assume a linear relationship between the different economic preferences and between all family members, but rather elements of a particular group are related to each other in terms of a generalized idea of proximity explained below. Factor analysis or principal component analysis rely on linear relationships between the different dimensions, which is an unnecessarily restrictive assumption, especially for the use with binary data (as in the social preferences domain). In comparison to model based approaches (e.g., Gaussian mixture models), cluster analysis is able to find clusters without having them or their probability distribution defined *ex ante*.

The approach we use in the cluster analysis is a *k-medoids*³³ clustering algorithm (Kaufman and Rousseeuw, 1987), also known as partitioning around medoids (PAM) clustering, which is more robust to outliers and noise than the well-known k-means approach. Given a number *k* of clusters, the algorithm works as follows: First, *k* points are selected from the data as medoids.

³³ The medoid is the representative point of a cluster and is a generalization of the median: It is an existing point of the dataset (such as the median for an odd number of 1-dimensional observations) chosen such that the sum of distances from the other points of the cluster to this point is minimal.

Then, every data point is associated with the closest medoid, i.e., assigned to the respective cluster. For this configuration, the total distance of the data to their respective medoid is calculated. Then, the k medoids are iteratively replaced by non-medoids if that change minimizes the total distance of the data to the medoids of the clusters. We determine the number k of clusters such that the average silhouette width³⁴ (Rousseeuw, 1987) or the Calinski-Harabasz statistic (Calinski and Harabasz, 1974) are minimized. Both criteria yield two as the optimal number of clusters (see Figures A.1 and A.2 in the Appendix).³⁵ This means that classifying families into two types of families – concerning the pattern of how risk, time and social preferences of family members look like – describes our full sample best. Accordingly, each family is assigned to one of two clusters that differ with respect to economic preferences within a family.

We used the package “cluster” in R (Maechler et al., 2019) for the cluster analysis. For the families where we have complete data for two children, we take the average of both children (using each child as a separate data point would not change any of our results qualitatively). Missing values are removed and assigned the highest possible value that is observed in all the data used multiplied by 1.1. When computing Euclidean distances, this means that (under the assumption that one just compares that one dimension) any two observations with missing values have a distance of zero, whereas compared to observations that have no missing values, the distance is quite big. In the data we use, this procedure corresponds to 5.27 standard deviations, where all the data are centered and standardized. For the analysis in Tables 13 and 14 we use this approach, which is suitable also to deal with our missing values for half of the children with respect to risk preferences.³⁶ In the Appendix (Table A.22) we show, however, that dropping all subjects with missing values yields practically the same types of clusters and insights.

Table 13 about here

Table 13 shows the results of the 2-medoids cluster analysis. The columns labelled Cluster 1 and Cluster 2 contain the mean of the respective economic preference (of fathers, mothers, and children) in the respective cluster. The penultimate column reports the difference between both clusters, and the last column contains the p -value of a t -test for equality of means. The table shows

³⁴ The silhouette value ranges from -1 to +1 and informs about how well a data point fits to its own cluster compared to the fit to the next best cluster. The higher the silhouette value of an observation, the better it fits to the cluster it is assigned to. With binary data only, particularly high silhouette values are not to be expected.

³⁵ Two clusters would even be the result when performing model based clustering using a Gaussian mixture model approach, where the number of clusters is selected such that it maximizes the value of the Bayesian Information Criteria (BIC) as model selection criteria.

³⁶ Note that if someone is not classified as either spiteful, egalitarian, altruistic or selfish, this does not constitute a missing value, but it represents a classification as neither of these social preference types.

that the two clusters of groups of families that we can identify are markedly different. 431 families are classified into Cluster 1, and 111 families into Cluster 2. Cluster 1-families are significantly more patient, more risk taking, less often spiteful, and more often altruistic or selfish (while for egalitarian social preference types there is no significant difference). Cluster 2-families are more impatient, more risk averse and in particular more often spiteful. Hence, the two clusters have almost diametrically opposed economic preferences, and so whole families are very different in the expression of their economic preferences. To visualize the two clusters in a two-dimensional space we have run a principal component analysis that has identified two significant factors. The key factor is the first one that loads strongly on the combination of spitefulness, risk and time preferences (as they are shown to relate; see Table 12). The second factor captures the rest and has a less clear interpretation. Figure 1 shows that the 542 families are cleanly divided into those belonging to Cluster 1 (circles) and those assigned to Cluster 2 (triangles). This raises the question whether we can identify which factors influence whether a family is assigned to Cluster 1 (the economically more promising cluster, given the evidence discussed in the introduction) or to Cluster 2.

Figure 1 about here

Table 14 presents a probit regression on whether a particular family has been assigned to Cluster 2 or not. Positive coefficients of the independent variables make it more likely to be assigned to Cluster 2, whereas negative coefficients mean that a family is more likely assigned to Cluster 1 (which corresponds to being less likely assigned to Cluster 2). As explanatory variables, we use fathers' and mothers' age, their years of schooling and their IQ, and in addition to that the household size (i.e., number of subjects living in the household) and the per capita monthly household income. Recall that the latter had no significant relation to single economic preferences of children when controlling for parents' preferences, but income turned partly significant when excluding parents' economic preferences, and it was also significant for fathers' altruism and selfishness. When dealing with family clusters with respect to economic preferences, Table 14 shows that income is significant such that richer households are more likely to be classified in Cluster 1 (with more patient, more risk tolerant and less spiteful members).

Table 14 about here

In addition, we note that larger households are more likely to belong to Cluster 1, while families with older fathers (not statistically significant) seem to be more likely assigned to Cluster

2. Note that we control for mothers' age, so the latter result could also be interpreted as if a larger difference in parents' age affects cluster assignment. The full-scale IQ of parents is not related to the family's cluster belonging. Controlling for all other variables, we see that more years of schooling of mothers make it more likely to belong to Cluster 2.³⁷ Even though more years of a mother's schooling goes hand in hand with higher income, which countervails this effect of the mother's education on cluster assignment, the effect of the mother's schooling on cluster assignment may look surprising as it seems to be at odds with the perception that more education correlates with more patience and risk tolerance. Of course, this perception is mainly based on evidence from rich and highly developed countries (like Germany, for example, see Falk et al., 2021). This seeming inconsistency raises the more general question of how our data from a poor and developing country relate to prior evidence from rich countries. While the breadth of this question in itself – comparing economic preferences between low-income and high-income countries – transgresses the scope of this paper, we would like to offer a brief discussion of the major differences between our data patterns and those from rich countries. The following section is therefore intended to broaden the lens from this paper's main focus on how preferences are transmitted and clustered within families to a wider perspective of how data patterns on economic preferences might differ between developing and developed countries. After this ensuing discussion we will conclude the paper.

6 Discussion of key differences of our data in comparison to evidence from rich, developed countries

Recall from Tables 6 and 7 that we had found a negative correlation between IQ or schooling and patience. At first sight, this finding is at odds with plenty of evidence from rich countries (e.g., Mischel and Metzner, 1962, Falk et al., 2021). Yet, there is hardly any research available on how IQ or schooling and patience are related to each other in developing countries, which leaves it open whether the patterns found in high-income countries apply also to low-income countries. In fact, focusing here on IQ, one might observe a transition during economic development in the following sense: it seems plausible that a higher IQ goes hand in hand with higher patience in developed and rich economies, because patience pays off in general in such a stable environment (Moffitt et al., 2011; Golsteyn et al., 2014). Yet, in developing and particularly in very poor countries, patience might not be a good strategy for survival, but rather subjects might be well-

³⁷ This is consistent with our finding in Appendix B on genetics that more educated children are more spiteful, and spiteful mothers (but not fathers) have a larger than genetically imposed impact on the spitefulness of their children.

advised to grab what is available at present because there might only be worse options available in the future. A higher IQ might make it all the clearer that this strategy (of grabbing what is available) is a reasonable strategy for survival, which then would go hand in hand with impatience.³⁸ Such an interpretation can be put to a test as it would suggest to find a positive relationship between IQ and patience in rich countries, a negative relation in very poor countries, and something in between (probably a flat relation) in middle-income countries.

Actually, such a pattern is what we observe in Figure 2. To construct it, we have first applied the World Bank's classification of countries into high-income, middle-income and low-income countries.³⁹ Then we have accessed the data from the Global Preferences Survey of Falk et al. (2018) and have taken math skills as a proxy for IQ (shown on the horizontal axis) and linked this proxy to patience (on the vertical axis). For high-income countries, we see a clearly (and significantly) positive relationship between IQ and patience, for middle-income countries a flat relationship, and for low-income countries a negative one (albeit insignificant). While this is highly aggregated evidence, our results from Tables 6 and 7 and the evidence in Figure 2 suggest that the prevailing pattern from rich countries on a positive relationship between IQ and patience need not reflect a universal pattern, but that the relationship may depend on the stage of a country's economic development. In the Appendix we present in Figures A.3 and A.4 how IQ (again proxied by math skills) is related to risk preferences and social preferences (both as measured in the Global Preference Survey by Falk et al., 2018) and how this relationship looks like in high-income, middle-income, and low-income countries. For risk and social preferences, we see less of a difference across countries with different income levels, and – contrary to our findings for patience – our data patterns for risk and social preferences do not look different from what can be found in rich countries.

Figure 2 about here

Another noteworthy, and at first sight surprising, finding of our paper is the negative influence of mothers' education on the likelihood of a family to be in the cluster with more patient, more risk tolerant and less spiteful members. In Figure 3, we use again the World Bank's classification of high-income, middle-income, and low-income countries and then show for the different sets of countries the relation between the level of patience (taken from the Global Preference Survey of Falk et al., 2018) and the average years of schooling in a particular country (taken from the United Nations Development Program; see

³⁸ Note that independent of IQ, poverty has been found to make subjects more present-biased (Carvalho et al., 2016).

³⁹ See <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519> (accessed on 1 June 2021).

<http://hdr.undp.org/en/indicators/103006>). For high-income countries, we see a clearly positive relationship: the average level of patience increases with the length of schooling. This relationship lets our result on a negative influence of (mothers') education on being in the cluster with higher patience appear to be surprising. However, for middle-income and low-income countries, we do not see a positive relationship in the aggregate. In fact, for Bangladesh there is a negative correlation ($r = -0.021$; $p = 0.19$) between years of schooling and patience if we look at the individual country level.

Figure 3 about here

More generally, evidence by Morrisset and Revoredo (1999) and Hua and Erreygers (2019) suggests that in developing countries, there can be a negative relation between education and savings in the short- and medium-run. Adding to this the observation that patience and savings are typically positively related (Falk et al., 2018), our finding that mother's education is positively related to the cluster with more impatient family members is compatible with these patterns from the literature. In Figures A.5 and A.6 in the Appendix we present the analogous data to those in Figure 3, but there for risk and social preferences. For risk, there is hardly any noticeable difference across countries with different income levels,⁴⁰ but for social preferences we note a negative (although insignificant) relation to education for low-income countries, which is compatible with our cluster analysis results. So, overall Figure 3 and Figures A.5 and A.6 in the Appendix show that the income level of countries matters for how schooling is related to economic preferences, yet the relation is not universal across all sets of countries, which we consider an important insight.

In addition to the data patterns on the relationship of economic preferences to IQ or education, there are also a few noteworthy aspects of how age is related to economic preferences. For example, the evidence from Fehr et al. (2008, 2013) from Switzerland and Austria shows a clearly declining fraction of spiteful subjects with increasing age (from the age of three to early adulthood). In our sample, the relation between spitefulness and age of children tends to be positive (for children up to 10 years, the fraction is at most 17% in each yearly cohort, but for children above age 10 the fraction ranges from 18% to 32% in yearly cohorts). Similarly, in our sample we find that parents are, on average, less patient than children. In rich countries we usually see an increase in patience with increasing age (see Sutter et al., 2019). In Bangladesh, this is not

⁴⁰ For example, Vieider et al. (2018) do not find a significant relation between education and subjects' risk taking in poor Ethiopia. For Germany, however, higher education seems to be related to more risk tolerance (Falk et al., 2021).

the case, and this might be driven by the developing country context discussed at the beginning of this discussion section and by strong improvements in education between the generations of parents and their children.

In sum, this section was intended to discuss briefly the most salient differences in our data patterns when comparing them to evidence from rich, developed countries. The main take-away from this discussion is that one should exert caution in applying evidence from rich, developed countries to poor, developing countries, and vice versa. Rather, we believe that we need to learn more about whether so-called well-established relationships (like between IQ and patience, for example) are really universal, or perhaps just confined to W.E.I.R.D. (western, educated, industrial, rich, and democratic) countries, in which only a minority of the World's population live. Collecting more evidence in the future will then also help us better understand the channels for the intergenerational transmission of economic preferences and how they might depend on the economic development of countries.

7 Conclusions

The formation of economic preferences has become a major subject of examination in the economics literature in recent years (e.g., Heckman, 2006; Dohmen et al., 2012; Bauer et al., 2014; Almas et al., 2016; Alan et al., 2017; Falk et al., 2021). The topic has become so prominent for two reasons: First, economic preferences, like time, risk, or social preferences, have been found to be very important for a subject's success in life (e.g., Burks et al., 2009; Mischel, 2014; Kosse and Tincani, 2020). Second, given the importance of economic preferences for success in life, a new literature has started to investigate how policy interventions in schools (Alan and Ertac, 2018) or families (Kosse et al., 2020) can shape and influence the economic preferences of children and teenagers. For both reasons, it is important to understand how economic preferences are formed.

The nucleus of the formation process lies in a subject's family, for which reason we have investigated a unique sample of 544 Bangladeshi families with a total of 1,999 family members. In running incentivized experiments with this sample, we have been the first to elicit in an incentivized way a whole set of economic preferences for husbands *and* wives *and* their children, while controlling for a large set of background variables, including socio-economic status of parents. Moreover, we have been the first to analyze the patterns and the interrelations of time, risk, and social preferences within families. This means that we have not only looked at one dimension of an economic preference one after the other, but we have jointly analyzed several dimensions, first on the individual level and then on the family level by examining clusters of families. The latter aspect is a major novelty of our paper, as we have also been able to identify

two distinct family clusters and analyze which background variables of parents influence to which cluster a family belongs to. As far as we can tell, no previous paper has made an attempt to provide such a 360 degree-perspective of economic preferences within families. On top of that, we provide the first evidence about (incentivized) economic preferences within families in a very poor country, which we see as an important complement to studies about transmission of economic preferences in rich, Western countries (e.g., Almas et al., 2016, Falk et al., 2021), because we reveal a few notable data patterns that deviate from the evidence from rich countries.

We have found that the economic preferences of mothers and fathers are in almost all cases positively and significantly related to their children's economic preferences. We find in almost all cases of economic preferences that the correlation between children and parents is equally strong for fathers and for mothers, clearly indicating that both parents are important in the formation of children's economic preferences. Previous studies (like, for example, Kosse and Pfeiffer, 2012, or Alan et al., 2017) have been unable to speak to the relative influence of both parents because they have only had access to the experimental choices of one parent. Given our findings that both parents are basically equally important in their relation to children's preferences (except for spitefulness where mothers are more important), our results suggest that it is unproblematic when previous studies have measured only one parent's economic preferences when explaining children's preferences. In the context of Bangladesh, our findings of equally strong relationships of husbands and wives are also noteworthy because most mothers work at home as housewives and spend much more time with their children than husbands do.

When we include both parents' preferences, socio-economic status – measured through household income and parents' level of education – is hardly ever significantly related to children's economic preferences when we measure and analyze them separately. This is, at first sight, in contradiction to recent work of Falk et al. (2021) who have found (for a rich country like Germany) that parental socio-economic status is a good predictor of children's economic preferences, such that richer and better educated parents have more patient, more risk tolerant and more prosocial children. Our results have not revealed a relation of socio-economic status to single preferences of children (as long as we control for parents' preferences). As such, our results are in line with Almas et al. (2016) or Brenoe and Epper (2018) who did not find a significant relationship either. However, our major innovation of examining family clusters might actually be able to reconcile these seemingly contradictory results with respect to how socio-economic status of parents is related to children's economic preferences.

In our cluster analysis, we have jointly analyzed time, risk, and social preferences and how they look like within families. Our analysis has yielded strong support for the existence of two clearly distinct clusters of families. One cluster, covering about four out of five families, is

characterized by relatively patient, risk tolerant and non-spiteful economic preferences of all family members. The other cluster, applying to about one in five families, has members who are fairly impatient, risk averse, and have spiteful social preferences. Analyzing the likelihood with which a particular family and its members belong to one or the other cluster, we have seen that household income and education of parents play a role. While for single economic preferences socio-economic status of parents has not been indicative of a particular configuration of that particular preference, the importance of the socio-economic status of parents – in our case of household income – re-emerges when we have analyzed family clusters in a joint analysis of time, risk, and social preferences. Richer households are more likely to have more patient, more risk tolerant and less spiteful members. So, when looking at the pattern of preferences across the three domains and at the level of the family, we can document an effect of parental socio-economic status also in a very poor country like Bangladesh (similar to Falk et al., 2021, for a rich country, Germany), while for single preferences such a relation was absent (like in Breno and Epper, 2018, or Almas et al., 2016).

Importantly, some of our results look different from well-known patterns from rich countries. For instance, we have seen a negative relationship between IQ (and schooling) and patience or a negative influence of (mothers') education on being assigned to the cluster with more patient, more risk tolerant and more prosocial family members. In our discussion section, we have provided evidence that these relationships – while unusual for high-income countries – are not at all uncommon in low-income countries (like Bangladesh in our case). These insights may serve as a note of caution when data from richer countries on economic preferences and their interrelationship to cognitive skills or socio-demographic background data were to be used to draw policy conclusions for poorer countries. Rather, it seems important to extend our knowledge of how economic preferences are formed and related to each other in poor countries, as better knowledge may ultimately help identifying children and families whose preferences are non-conducive to economic success, and as such it might become important for designing policy interventions to promote a configuration of economic preferences that leads to long-term success in life (Alan and Ertac, 2018; Kosse et al., 2020).

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Tables

Table 1: Summary statistics of participants

	Mean	Std. Dev.
Parents (N=542 for each parent)		
Age husband (in years)	47.11	8.64
Age wife (in years)	38.47	6.89
Schooling husband (in years)	3.07	4.04
Schooling wife (in years)	3.17	3.48
Husband works as a farmer (yes=1, no=0)	0.52	0.50
Wife works as a housewife (yes=1, no=0)	0.95	0.21
Children (N=907)		
Gender (boys= 0, girls= 1)	0.51	0.50
Age (in years)	12.21	2.89
Schooling (in years)	3.97	2.73
Currently attending school (yes=1, no=0)	0.93	0.26
Number of elder brothers	0.95	1.06
Number of elder sisters	0.93	1.06
Number of younger brothers	0.61	0.76
Number of younger sisters	0.57	0.76
Household data (N = 542)		
Household size (# of persons)	5.78	1.36
Grandparents living in household (yes=1)	0.15	0.36
Average household income per capita per month in 2016 (in Taka)	1,640.00	1,810.00
Total village population	1,704.98	1,854.37

Notes: Data refer to 2016 (except village population for 2015)

Std. Dev.: Standard deviation

Table 2: The three experiments

Panel A: Time preferences		
	Children	
	Option 1	Option 2
Choice set 1	2 stars tomorrow vs.	3 stars in 3 weeks
	2 stars tomorrow vs.	4 stars in 3 weeks
Choice set 2	2 stars tomorrow vs.	3 stars in 3 months
	2 stars tomorrow vs.	4 stars in 3 months
Choice set 3	2 stars in 1 month vs.	3 stars in 4 months
	2 stars in 1 month vs.	4 stars in 4 months
	Parents	
Choice set 1	100 Taka tomorrow vs.	105 Taka in 3 months
	100 Taka tomorrow vs.	110 Taka in 3 months
	100 Taka tomorrow vs.	120 Taka in 3 months
	100 Taka tomorrow vs.	125 Taka in 3 months
	100 Taka tomorrow vs.	150 Taka in 3 months
	100 Taka tomorrow vs.	200 Taka in 3 months
Choice set 2	100 Taka in 1 month vs.	105 Taka in 4 months
	100 Taka in 1 month vs.	110 Taka in 4 months
	100 Taka in 1 month vs.	120 Taka in 4 months
	100 Taka in 1 month vs.	125 Taka in 4 months
	100 Taka in 1 month vs.	150 Taka in 4 months
	100 Taka in 1 month vs.	200 Taka in 4 months
Choice set 3	100 Taka in 1 year vs.	105 Taka in 1 year 3 months
	100 Taka in 1 year vs.	110 Taka in 1 year 3 months
	100 Taka in 1 year vs.	120 Taka in 1 year 3 months
	100 Taka in 1 year vs.	125 Taka in 1 year 3 months
	100 Taka in 1 year vs.	150 Taka in 1 year 3 months
	100 Taka in 1 year vs.	200 Taka in 1 year 3 months

Continued on next page

Table 2 – continued

Panel B: Risk preferences – payoffs offered to different age groups (in Taka)

Age	Outcome	Gamble #1	Gamble #2	Gamble #3	Gamble #4	Gamble #5	Gamble #6
6-7 years	Low	13	11	10	8	3	0
	High	13	24	30	38	47	50
8-9 years	Low	19	17	15	11	4	0
	High	19	36	45	56	71	75
10-11 years	Low	25	23	20	15	5	0
	High	25	48	60	75	95	100
12-13 years	Low	38	33	30	22	8	0
	High	38	72	90	112	142	150
14-15 years	Low	44	39	35	26	9	0
	High	44	84	105	131	166	175
16-17 years	Low	63	55	50	38	13	0
	High	63	120	150	188	237	250
Parents	Low	125	110	100	75	25	0
	High	125	240	300	375	475	500

Notes: Participants had to pick one out of the six gambles.

Panel C: Social preferences

	Option 1	Option 2	In short
Prosocial game	1 star for me	1 star for me	(1,1) vs. (1,0)
	1 star for other child	0 star for other child	
Envy game	1 star for me	1 star for me	(1,1) vs. (1,2)
	1 star for other child	2 stars for other child	
Sharing game	1 star for me	2 star for me	(1,1) vs. (2,0)
	1 star for other child	0 stars for other child	
Efficiency game	1 star for me	2 stars for me	(1,1) vs. (2,3)
	1 star for other child	3 stars for other child	

Table 3: Classification of subjects into four social preference types based on the games presented in Panel C of Table 2.

	Sharing game (1,1) vs. (2,0)	Prosocial game (1,1) vs (1,0)	Envy game (1,1) vs (1,2)	Efficiency game (1,1) vs (2,3)
Altruistic	(1,1)	(1,1)	(1,2)	(2,3)
Egalitarian	(1,1)	(1,1)	(1,1)	(1,1)
Spiteful	(2,0)	(1,0)	(1,1)	(1,1)
Selfish	(2,0)	(1,1) or (1,0)	(1,1) or (1,2)	(2,3)

Table 4: Economic preferences of parents and children – Descriptive overview

Parents	Total		Wives		Husbands		Difference (<i>p</i> -value) Husbands vs Wives
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	
Number of patient choices	7.25	7.03	7.79	6.99	6.70	7.04	0.01
Gamble number picked	3.93	1.70	3.91	1.73	3.94	1.66	0.76
Altruistic (1,0) [#]	0.08	0.27	0.06	0.25	0.10	0.29	0.06
Egalitarian (1,0) [#]	0.15	0.36	0.09	0.29	0.22	0.41	0.00
Spiteful (1,0) [#]	0.20	0.40	0.21	0.41	0.18	0.39	0.29
Selfish (1,0) [#]	0.32	0.47	0.37	0.48	0.28	0.45	0.00
Unclassified social preference	0.24	0.43	0.27	0.44	0.22	0.41	0.08
Number of Observations	1,084		542		542		

Children: Boys vs. girls	Total		Girls		Boys		Difference (<i>p</i> -value) Boys vs Girls
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	
Number of patient choices	2.79	2.18	7.79	6.99	6.70	7.04	0.25
Gamble number picked	3.88	1.59	3.91	1.73	3.94	1.66	0.62
Altruistic (1,0) [#]	0.07	0.25	0.06	0.25	0.10	0.29	0.45
Egalitarian (1,0) [#]	0.17	0.37	0.09	0.29	0.22	0.41	0.85
Spiteful (1,0) [#]	0.20	0.40	0.21	0.41	0.18	0.39	0.97
Selfish (1,0) [#]	0.31	0.46	0.37	0.48	0.28	0.45	0.84
Unclassified social preference	0.25	0.44	0.27	0.44	0.22	0.41	0.43
Number of Observations	907		445		462		

Std. dev.: standard deviation

[#] relative frequencies of particular social preference types (the sum of relative frequencies need not add up to 1 for the four social preference types together)

Table 5: Correlations of economic preferences

	(1)	(2)	(3)	(4)
	Husbands and wives	Siblings	Mothers and children	Fathers and children
Number of patient choices	0.242***	0.328***	0.185***	0.166***
Gamble number picked	0.100**	0.312***	0.130***	0.076
Spiteful	0.595***	0.515***	0.578***	0.455***
Egalitarian	0.081*	0.147***	0.105***	0.098***
Altruistic	0.042	0.034	0.090***	0.074**
Selfish	0.135***	0.304***	0.220***	0.169***

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Assortativity of parental preferences

Panel A: Husbands' preferences

	Number of patient choices	Lottery number picked	Spiteful (0/1)	Egalitarian (0/1)	Altruistic (0/1)	Selfish (0/1)
Wife's preference	0.185*** (0.045)	0.092** (0.043)	0.336*** (0.063)	0.092 (0.070)	0.034 (0.050)	0.037 (0.041)
Age of respondent	-0.011 (0.049)	-0.005 (0.011)	0.002 (0.002)	-0.001 (0.003)	0.000 (0.002)	-0.000 (0.003)
Difference in spouses' age	-0.009 (0.078)	-0.008 (0.019)	-0.007** (0.004)	0.004 (0.005)	0.001 (0.003)	0.001 (0.005)
Years of schooling	-0.176* (0.105)	-0.003 (0.025)	0.007 (0.005)	0.006 (0.006)	0.002 (0.004)	0.003 (0.007)
Difference in spouses' schooling	-0.024 (0.122)	-0.003 (0.030)	-0.001 (0.006)	0.002 (0.007)	-0.002 (0.005)	-0.008 (0.008)
Number of children	3.746*** (1.298)	-0.418 (0.281)	0.064 (0.088)	-0.196** (0.095)	-0.034 (0.055)	0.118 (0.140)
Household size	0.510** (0.241)	0.062 (0.054)	-0.022* (0.012)	-0.004 (0.013)	0.001 (0.008)	0.003 (0.015)
Per capita income per month (in thousand taka)	0.035 (0.154)	0.036 (0.050)	-0.005 (0.009)	0.014 (0.009)	0.014** (0.006)	-0.026* (0.014)
Full Scale IQ measure	-0.523 (0.388)	0.132 (0.095)	0.007 (0.017)	0.027 (0.023)	-0.021* (0.013)	-0.041 (0.028)
Conscientiousness	-0.071 (0.366)	-0.008 (0.089)	0.014 (0.018)	0.026 (0.020)	0.035** (0.014)	-0.037* (0.022)
Extraversion	-0.241 (0.345)	-0.070 (0.093)	-0.022 (0.017)	0.025 (0.021)	0.004 (0.013)	0.001 (0.023)
Agreeableness	0.285 (0.340)	-0.037 (0.085)	-0.047*** (0.016)	0.021 (0.021)	0.006 (0.011)	0.018 (0.023)
Openness	0.024 (0.306)	0.122* (0.073)	-0.006 (0.015)	-0.013 (0.017)	-0.018 (0.011)	0.028 (0.021)
Neuroticism	0.186 (0.322)	-0.033 (0.093)	-0.004 (0.017)	0.000 (0.020)	0.002 (0.013)	0.003 (0.023)
Locus of control	-0.317 (0.310)	-0.125 (0.084)	0.008 (0.015)	0.025 (0.018)	-0.015 (0.012)	-0.027 (0.022)
Observations	540	536	531	538	536	536
R ² / Pseudo-R ²	0.135	0.090	0.407	0.090	0.124	0.119
District Fixed Effects are included?	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Husband's preference is regressed on wife's preference. Additional covariates controlled for in all specifications, but not reported in the table, are: number of younger and elder siblings, profession and district fixed effects. OLS in column 1 & 2, and probit marginal effects reported in columns 3-6. R² refers to OLS, Pseudo-R² to probit regressions. Standard errors in parentheses are clustered at household level. *** p<0.01, ** p<0.05, * p<0.1.

Table 6 - continued

Panel B: Wives' preferences

	Number of patient choices	Lottery number picked	Spiteful (0/1)	Egalitarian (0/1)	Altruistic (0/1)	Selfish (0/1)
Husband's preference	0.154*** (0.043)	0.094** (0.048)	0.355*** (0.063)	0.033 (0.033)	0.015 (0.028)	0.064 (0.049)
Age of respondent	-0.106** (0.047)	-0.002 (0.012)	-0.003 (0.003)	0.001 (0.002)	-0.002 (0.001)	0.000 (0.003)
Difference in spouses' age	0.006 (0.056)	0.001 (0.017)	-0.002 (0.003)	0.001 (0.002)	-0.001 (0.002)	-0.001 (0.004)
Years of schooling	-0.317** (0.125)	-0.066** (0.031)	0.002 (0.007)	-0.001 (0.005)	0.001 (0.004)	-0.007 (0.009)
Difference in spouses' schooling	0.208* (0.120)	-0.018 (0.033)	0.004 (0.007)	0.007* (0.004)	0.003 (0.003)	0.007 (0.009)
Number of children	-2.419 (1.995)	0.044 (0.433)	0.041 (0.065)	-0.097 (0.061)	0.019 (0.048)	0.179 (0.169)
Household size	-0.092 (0.212)	-0.010 (0.055)	0.007 (0.014)	-0.013 (0.008)	0.005 (0.006)	-0.009 (0.016)
Per capita income per month (in thousand taka) ⁴	0.036 (0.167)	0.030 (0.058)	-0.008 (0.010)	0.002 (0.005)	-0.001 (0.005)	0.014 (0.012)
Full Scale IQ measure	-0.015 (0.407)	0.178* (0.102)	0.022 (0.023)	0.011 (0.014)	-0.010 (0.011)	-0.035 (0.029)
Conscientiousness	-0.334 (0.300)	-0.065 (0.077)	0.007 (0.019)	0.019 (0.012)	0.020** (0.010)	-0.056** (0.023)
Extraversion	0.899*** (0.322)	0.130 (0.083)	-0.033 (0.020)	-0.006 (0.012)	0.023*** (0.008)	-0.010 (0.025)
Agreeableness	0.079 (0.272)	-0.035 (0.072)	-0.010 (0.018)	-0.007 (0.010)	0.005 (0.008)	0.005 (0.021)
Openness	-0.004 (0.339)	0.094 (0.093)	0.014 (0.023)	0.019 (0.014)	-0.021** (0.010)	-0.011 (0.025)
Neuroticism	-0.287 (0.294)	-0.089 (0.070)	-0.027* (0.015)	0.010 (0.011)	0.009 (0.009)	0.023 (0.022)
Locus of control	-0.007 (0.325)	-0.136 (0.089)	0.017 (0.020)	0.026* (0.013)	0.005 (0.008)	-0.011 (0.026)
Observations	538	534	531	529	531	530
R ² / Pseudo-R ²	0.187	0.062	0.467	0.092	0.148	0.114
District Fixed Effects are included?	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Wife's preference is regressed on husband's preference. Additional covariates controlled for in all specifications, but not reported in the table, are: number of younger and elder siblings, profession and district fixed effects. OLS in column 1 & 2, and probit marginal effects reported in columns 3-6. R² refers to OLS, Pseudo-R² to probit regressions. Standard errors in parentheses are clustered at household level. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Children's preferences and their relation to parental preferences

	Number of patient choices	Gamble number picked	Spiteful (0/1)	Egalitarian (0/1)	Altruistic (0/1)
Parent's preference - father	0.036*** (0.011)	0.075 (0.049)	0.074* (0.045)	0.070** (0.034)	0.056* (0.035)
Parent's preference - mother	0.048*** (0.012)	0.116** (0.052)	0.342*** (0.055)	0.096** (0.051)	0.101*** (0.045)
Gender (Male 1, Female 0)	-0.334** (0.143)	-0.039 (0.156)	0.017 (0.025)	0.017 (0.025)	0.005 (0.016)
Age of respondent	0.042 (0.058)	-0.107* (0.058)	-0.011 (0.009)	0.007 (0.009)	0.004 (0.005)
Years of schooling	-0.108** (0.053)	0.084 (0.058)	0.021** (0.010)	-0.008 (0.009)	-0.004 (0.005)
Attending school (=1, 0 otherwise)	-0.054 (0.270)	0.134 (0.372)	0.010 (0.053)	0.051 (0.042)	0.001 (0.028)
Father's years of schooling	0.014 (0.025)	-0.031 (0.024)	-0.006 (0.004)	-0.005 (0.004)	0.003 (0.002)
Mother's years of schooling	-0.001 (0.030)	0.022 (0.031)	0.004 (0.005)	0.005 (0.005)	-0.002 (0.003)
Household size	-0.026 (0.090)	0.108 (0.098)	0.000 (0.014)	-0.026* (0.014)	-0.012* (0.007)
Per cap income per month (in thousand taka)	0.061 (0.041)	-0.071 (0.051)	0.001 (0.007)	0.006 (0.009)	0.004 (0.003)
Full Scale IQ measure of child	-0.412*** (0.111)	-0.070 (0.118)	0.023 (0.020)	0.060*** (0.020)	-0.013 (0.011)
Conscientiousness	-0.032 (0.080)	0.139* (0.077)	0.010 (0.015)	-0.000 (0.013)	0.009 (0.009)
Extraversion	-0.208*** (0.075)	-0.045 (0.076)	-0.016 (0.013)	0.016 (0.013)	0.008 (0.008)
Agreeableness	-0.085 (0.077)	0.010 (0.085)	-0.029** (0.014)	0.034** (0.014)	-0.009 (0.008)
Openness	0.087 (0.071)	0.007 (0.082)	0.021 (0.013)	-0.023* (0.012)	0.007 (0.007)
Neuroticism	0.009 (0.070)	0.092 (0.080)	0.007 (0.012)	0.004 (0.011)	-0.006 (0.008)
Locus of control	0.022 (0.070)	-0.029 (0.078)	-0.039** (0.015)	0.020 (0.013)	-0.005 (0.007)
Observations	896	452	897	897	897
R ² / Pseudo-R ²	0.148	0.076	0.398	0.081	0.080
District Fixed Effects are included?	Yes	Yes	Yes	Yes	Yes
p-value for F-test: Husband=Wife	0.527	0.586	0.001	0.709	0.459

Additional covariates controlled for in all specifications, but not reported in the table, are: number of younger and older siblings, age and education of father and mother, household size, grandparents dummy, village population and district fixed effects. OLS coefficients reported in columns 1 and 2, probit marginal effects reported in columns 3-6. R² refers to OLS, Pseudo-R² to probit regressions. Standard errors in parentheses are clustered at household level. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Children's preferences and their relation to parental preferences – Taking parenting styles into account

VARIABLES	Number of patient choices	Gamble number picked	Spiteful (0/1)	Egalitarian (0/1)	Altruistic (0/1)	Selfish (0/1)
Parent's preference - father	0.035*** (0.012)	0.071 (0.052)	0.092** (0.046)	0.087*** (0.037)	0.102*** (0.050)	0.123*** (0.043)
Parent's preference - mother	0.045*** (0.012)	0.112** (0.057)	0.426*** (0.053)	0.139*** (0.060)	0.099*** (0.047)	0.202*** (0.041)
Negative parenting	-0.082 (0.058)	-0.030 (0.060)	0.004 (0.009)	0.002 (0.009)	0.005 (0.006)	0.002 (0.013)
Positive parenting	-0.014 (0.076)	0.099 (0.086)	-0.003 (0.013)	0.002 (0.012)	0.009 (0.007)	-0.011 (0.018)
Gender (Male 1, Female 0)	-0.340** (0.154)	0.126 (0.165)	0.013 (0.026)	0.023 (0.026)	0.004 (0.018)	0.001 (0.035)
Age of respondent	0.088 (0.065)	-0.095 (0.059)	-0.006 (0.010)	-0.003 (0.010)	0.005 (0.005)	0.012 (0.013)
Years of schooling	-0.144** (0.059)	0.076 (0.061)	0.021** (0.010)	0.000 (0.010)	-0.005 (0.006)	-0.010 (0.013)
Attending school (=1)	-0.068 (0.292)	0.104 (0.392)	0.057 (0.043)	0.045 (0.046)	0.006 (0.030)	-0.116* (0.072)
Father's years of schooling	0.002 (0.026)	-0.051* (0.027)	-0.008* (0.004)	-0.004 (0.004)	0.002 (0.003)	0.000 (0.006)
Mother's years of schooling	0.032 (0.031)	0.021 (0.032)	0.006 (0.005)	0.003 (0.005)	-0.002 (0.003)	0.005 (0.007)
Household size	-0.007 (0.094)	0.128 (0.102)	0.005 (0.013)	-0.033** (0.015)	-0.015* (0.008)	0.074*** (0.020)
Per cap income/month (in thousand taka)	0.065 (0.043)	-0.071 (0.058)	0.001 (0.007)	0.005 (0.009)	0.002 (0.004)	-0.003 (0.011)
Full Scale IQ measure of child	-0.385*** (0.121)	-0.104 (0.135)	0.021 (0.021)	0.055** (0.022)	-0.022* (0.013)	-0.063** (0.031)
Conscientiousness	-0.039 (0.088)	0.119 (0.078)	0.007 (0.014)	0.006 (0.014)	0.007 (0.010)	0.004 (0.019)
Extraversion	-0.266*** (0.078)	-0.048 (0.083)	-0.023* (0.013)	0.020 (0.013)	0.014 (0.008)	-0.017 (0.018)
Agreeableness	-0.132 (0.084)	-0.028 (0.086)	-0.016 (0.014)	0.024* (0.013)	-0.004 (0.009)	-0.018 (0.018)
Openness	0.150* (0.077)	0.064 (0.087)	0.024* (0.013)	-0.023* (0.012)	0.010 (0.009)	0.016 (0.019)
Neuroticism	0.062 (0.075)	-0.000 (0.080)	0.015 (0.012)	-0.010 (0.012)	-0.003 (0.009)	0.031* (0.018)
Locus of control	0.041 (0.080)	0.006 (0.085)	-0.043*** (0.016)	0.012 (0.014)	0.001 (0.008)	0.037* (0.020)
Observations	770	387	770	770	770	770
R ² / Pseudo-R ²	0.153	0.084	0.390	0.083	0.078	0.123
District Fixed Effects are included?	Yes	Yes	Yes	Yes	Yes	Yes
p-value (F-test) Father=Mother	0.595	0.626	0.000	0.482	0.962	0.193
p-value for F-test: joint significance of parents preferences	0.000	0.036	0.000	0.002	0.000	0.000
p-value for F-test: joint significance of parenting style	0.352	0.466	0.905	0.961	0.350	0.820

Additional covariates controlled for in all specifications, but not reported in the table, are: number of younger and older siblings, age and education of father and mother, household size, grandparents dummy, village population and district fixed effects. OLS coefficients reported in columns 1 and 2, probit marginal effects reported in columns 3-6. R² refers to OLS, Pseudo-R² to probit regressions. Standard errors in parentheses are clustered at household level. *** p<0.01, ** p<0.05, * p<0.1

Table 9: Children's preferences and their relation to parental preferences – Adding homogeneity/heterogeneity of parents

VARIABLES	(1) number of patient choices	(2) Gamble number picked:	(3) spiteful	(4) egalitarian	(5) altruistic	(6) selfish
Father's preference	0.045** (0.018)	0.034 (0.064)	-0.024 (0.053)	0.077** (0.036)	0.010 (0.034)	0.108** (0.052)
Mother's preference	0.053*** (0.020)	0.093 (0.068)	0.504*** (0.093)	0.037 (0.049)	0.125*** (0.066)	0.136*** (0.046)
Father's preference × parents homogeneity	-0.030 (0.049)	0.082 (0.155)	0.150* (0.107)	-0.045 (0.066)	0.112 (0.096)	-0.024 (0.076)
Mother's preference × parents homogeneity	0.012 (0.049)	0.013 (0.169)	-0.110** (0.032)	0.167 (0.140)	-0.018 (0.035)	-0.053 (0.067)
Parents homogeneity	0.194 (0.327)	-0.553 (0.564)	0.041 (0.050)	0.028 (0.040)	-0.011 (0.016)	-0.085* (0.047)
Observations	896	452	888	889	895	889
(Pseudo) R-squared	0.138	0.067	0.394	0.073	0.077	0.155
District Fixed Effects are included?	Yes	Yes	Yes	Yes	Yes	Yes
p-value: Father=Mother	0.676	0.445	0.000	0.478	0.117	0.672
p-value (F-test): joint signi-ficance of parents preferences	0.013	0.396	0.000	0.059	0.026	0.001
p-value (F-test): father's preference + father × parents homogeneous	0.747	0.425	0.030	0.793	0.009	0.202
p-value (F-test): mother's preference + mother × parents homogeneous	0.149	0.488	0.000	0.041	0.113	0.189

Additional covariates controlled for in all specifications, but not reported above, are: gender, age, years of schooling, an indicator for currently attending school or not, Full-scale IQ, Big-5 personality traits, locus of control, number of younger and older siblings, age and education of father and mother, household size, per capita income, grandparents dummy, village population and district fixed effects. OLS coefficients reported in columns 1 and 2, probit marginal effects reported in columns 3-6. R² refers to OLS, Pseudo-R² to probit regressions. Standard errors in parentheses are clustered at household level. *** p<0.01, ** p<0.05, * p<0.1

Table 10: Children's preferences and their relation to parental preferences – Estimating the older sibling's influence

VARIABLES	Number of patient choices	Gamble number picked	Spiteful (0/1)	Egalitarian (0/1)	Altruistic (0/1)	Selfish (0/1)
Parent's preference - father	0.018 (0.017)	0.184 (0.115)	-0.030 (0.055)	0.044 (0.043)	0.048 (0.058)	0.116* (0.063)
Parent's preference - mother	0.057*** (0.017)	0.358*** (0.124)	0.511*** (0.108)	0.037 (0.053)	0.125** (0.084)	0.125** (0.062)
Older's siblings preference residuals	0.318*** (0.054)	0.278** (0.135)	0.012 (0.047)	-0.044 (0.197)	-0.028 (0.057)	0.060 (0.045)
Gender (Male 1, Female 0)	-0.136 (0.215)	0.175 (0.393)	0.003 (0.041)	0.011 (0.027)	-0.009 (0.023)	0.025 (0.053)
Age of respondent	0.290*** (0.108)	-0.139 (0.171)	-0.028 (0.024)	-0.008 (0.014)	0.012 (0.010)	0.013 (0.026)
Years of schooling	-0.312** (0.124)	-0.047 (0.193)	0.036 (0.024)	0.010 (0.015)	-0.014 (0.014)	-0.011 (0.030)
Attending school (=1, 0 otherwise)	-0.160 (0.457)	0.757 (0.763)		0.016 (0.051)	0.047 (0.022)	-0.408*** (0.112)
Father's years of schooling	-0.007 (0.036)	-0.105* (0.058)	-0.011* (0.007)	-0.007 (0.005)	0.000 (0.004)	0.002 (0.009)
Mother's years of schooling	-0.015 (0.042)	0.040 (0.070)	0.006 (0.008)	0.008 (0.006)	-0.003 (0.005)	0.008 (0.011)
Household size	0.198* (0.118)	0.163 (0.169)	-0.006 (0.021)	-0.031 (0.017)	-0.007 (0.011)	0.074** (0.029)
Per cap income per month (in thousand taka)	0.030 (0.051)	-0.185 (0.175)	0.016 (0.012)	0.003 (0.009)	0.010** (0.005)	-0.020 (0.014)
Full Scale IQ measure of child	-0.044 (0.179)	0.493* (0.275)	0.044 (0.036)	0.027 (0.024)	-0.002 (0.021)	-0.099** (0.047)
Conscientiousness	-0.086 (0.128)	0.353 (0.221)	-0.012 (0.019)	-0.000 (0.016)	-0.000 (0.013)	0.047 (0.030)
Extraversion	-0.195 (0.122)	0.153 (0.208)	0.004 (0.019)	0.012 (0.018)	0.002 (0.012)	0.042 (0.029)
Agreeableness	0.023 (0.119)	-0.149 (0.231)	-0.005 (0.024)	0.036** (0.015)	-0.024** (0.011)	0.003 (0.028)
Openness	0.051 (0.123)	0.002 (0.188)	0.025 (0.017)	0.013 (0.016)	0.011 (0.011)	0.020 (0.028)
Neuroticism	0.082 (0.117)	0.331* (0.193)	0.013 (0.019)	0.015 (0.014)	-0.000 (0.012)	0.015 (0.027)
Locus of control	0.068 (0.111)	0.123 (0.189)	-0.043* (0.024)	-0.012 (0.015)	-0.003 (0.011)	0.046* (0.027)
Observations	359	90	336	357	357	357
R ² / Pseudo-R ²	0.228	0.414	0.460	0.150	0.131	0.177
District Fixed Effects are included?	Yes	Yes	Yes	Yes	Yes	Yes
p-value for F-test: Father=Mother	0.146	0.289	0.001	0.906	0.459	0.908
p-value for F-test: joint significance of parents' preferences	0.001	0.008	0.000	0.321	0.078	0.016

Additional covariates controlled for in all specifications, but not reported above, are: number of younger and older siblings, age and education of father and mother, household size, grandparents dummy, village population and district fixed effects. OLS coefficients reported in columns 1 and 2, probit marginal effects reported in columns 3-6. R² refers to OLS, Pseudo-R² to probit regressions. Standard errors in parentheses are clustered at household level. *** p<0.01, ** p<0.05, * p<0.1

Table 11: Children's preferences and their relation to parental preferences – Taking into account peers in one's village

	Number of patient choices	Gamble number picked	Spiteful (0/1)	Egalitarian (0/1)	Altruistic (0/1)	Selfish (0/1)
Parent's preference - husband	0.031*** (0.011)	0.073 (0.049)	0.048 (0.042)	0.062* (0.034)	0.058** (0.036)	0.075* (0.040)
Parent's preference - wife	0.043*** (0.011)	0.112** (0.052)	0.242*** (0.053)	0.090** (0.050)	0.104*** (0.050)	0.112*** (0.037)
Average village preference	0.325*** (0.070)	-0.029 (0.099)	0.330*** (0.066)	0.152* (0.079)	0.003 (0.068)	0.171** (0.082)
Gender (Male 1, Female 0)	-0.334** (0.141)	-0.036 (0.156)	0.019 (0.026)	0.017 (0.024)	0.006 (0.016)	0.001 (0.032)
Age of respondent	0.033 (0.056)	-0.109* (0.059)	-0.012 (0.009)	0.008 (0.009)	0.004 (0.005)	0.005 (0.012)
Years of schooling	-0.116** (0.052)	0.088 (0.059)	0.023** (0.010)	-0.009 (0.009)	-0.004 (0.005)	-0.001 (0.012)
Attending school (=1, 0 otherwise)	-0.007 (0.269)	0.126 (0.371)	-0.408** (0.112)	-0.408 (0.112)	-0.408 (0.112)	-0.408 (0.112)
Father's years of schooling	0.018 (0.023)	-0.029 (0.024)	-0.005 (0.004)	-0.004 (0.004)	0.003 (0.002)	0.004 (0.005)
Mother's years of schooling	-0.007 (0.029)	0.020 (0.032)	0.003 (0.005)	0.005 (0.005)	-0.002 (0.003)	0.001 (0.007)
Household size	-0.013 (0.084)	0.114 (0.098)	-0.003 (0.013)	-0.025* (0.014)	-0.012* (0.007)	0.055*** (0.017)
Per cap income per month (in thousand taka)	0.045 (0.040)	-0.067 (0.051)	0.001 (0.007)	0.004 (0.009)	0.004 (0.003)	-0.012 (0.010)
Full Scale IQ measure of child	-0.346*** (0.110)	-0.065 (0.119)	0.022 (0.021)	0.058*** (0.020)	-0.013 (0.011)	-0.079*** (0.027)
Conscientiousness	-0.044 (0.081)	0.121 (0.077)	0.009 (0.015)	-0.001 (0.013)	0.009 (0.010)	0.006 (0.018)
Extraversion	-0.204*** (0.073)	-0.059 (0.077)	-0.001 (0.013)	0.014 (0.013)	0.008 (0.008)	-0.015 (0.016)
Agreeableness	-0.084 (0.075)	-0.001 (0.086)	-0.026* (0.015)	0.033** (0.013)	-0.009 (0.008)	-0.014 (0.017)
Openness	0.086 (0.072)	0.009 (0.083)	0.026** (0.013)	-0.023* (0.012)	0.007 (0.007)	0.016 (0.017)
Neuroticism	-0.003 (0.070)	0.100 (0.080)	0.006 (0.012)	0.002 (0.011)	-0.005 (0.008)	0.017 (0.016)
Locus of control	0.002 (0.070)	-0.027 (0.078)	-0.018 (0.017)	0.014 (0.013)	-0.004 (0.007)	0.018 (0.018)
Observations	891	450	892	892	892	892
R ² / Pseudo-R ²	0.175	0.073	0.427	0.086	0.081	0.158
District Fixed Effects are included?	Yes	Yes	Yes	Yes	Yes	Yes
p-value for F-test: Husband=Wife	0.507	0.610	0.013	0.679	0.470	0.489
p-value for F-test: joint significance of parents' preferences	0.000	0.023	0.000	0.019	0.002	0.001

Additional covariates controlled for in all specifications, but not reported here, are: number of younger and older siblings, age and education of father and mother, household size, grandparents dummy, village population and district fixed effects. OLS coefficients reported in columns 1 and 2, probit marginal effects reported in columns 3-6. R² refers to OLS, Pseudo-R² to probit regressions. Standard errors in parentheses are clustered at household level. *** p<0.01, ** p<0.05, * p<0.1

Table 12: Correlations across preferences (within individuals)

Husband	Number of patient choices	Gamble number picked	Spiteful	Egalitarian	Altruistic	Selfish
Gamble number picked	0.018					
Spiteful	-0.234***	-0.133***				
Egalitarian	-0.078*	-0.047	-0.252***			
Altruistic	0.110**	0.011	-0.155***	-0.173***		
Selfish	0.130***	0.147***	-0.297***	-0.331***	-0.203***	
Unclassified	0.078*	0.004	-0.252***	-0.281***	-0.173***	-0.331***

Wife	Number of patient choices	Gamble number picked	Spiteful	Egalitarian	Altruistic	Selfish
Gamble number picked	0.102**					
Spiteful	-0.292***	-0.103**				
Egalitarian	-0.049	-0.092**	-0.163***			
Altruistic	0.040	-0.030	-0.136***	-0.083*		
Selfish	0.169***	0.169***	-0.395***	-0.241***	-0.201***	
Unclassified	0.094**	-0.013	-0.310***	-0.190***	-0.158***	-0.460***

Children	Number of patient choices	Gamble number picked	Spiteful	Egalitarian	Altruistic	Selfish
Gamble number picked	0.126***					
Spiteful	-0.064*	-0.046				
Egalitarian	-0.209***	-0.075	-0.226***			
Altruistic	0.005	0.006	-0.137***	-0.123***		
Selfish	0.194***	0.040	-0.334***	-0.299***	-0.182***	
Unclassified	0.031	0.063	-0.293***	-0.263***	-0.159***	-0.387***

*** p<0.01, ** p<0.05, * p<0.1

Table 13: Summary of characteristics represented in two clusters resulting from partitioning around medoids (2-Medoids) - Aggregating offspring at the household level

	Cluster 1	Cluster 2	Difference	<i>p</i> -value
Number of patient choices children	2.93	2.51	0.42	0.04
Number of patient choices father	7.82	2.36	5.46	0.00
Number of patient choices mother	9.19	2.34	6.85	0.00
Gamble number picked children	3.94	3.67	0.26	0.17
Gamble number picked father	4.12	3.25	0.87	0.00
Gamble number picked mother	4.00	3.58	0.42	0.02
Spiteful children	0.08	0.68	-0.60	0.00
Spiteful father	0.03	0.77	-0.73	0.00
Spiteful mother	0.04	0.87	-0.83	0.00
Egalitarian children	0.19	0.12	0.07	0.04
Egalitarian father	0.23	0.16	0.07	0.10
Egalitarian mother	0.11	0.02	0.09	0.00
Altruistic children	0.08	0.00	0.08	0.00
Altruistic father	0.12	0.01	0.11	0.00
Altruistic mother	0.08	0.01	0.07	0.01
Selfish children	0.36	0.11	0.25	0.00
Selfish father	0.34	0.05	0.30	0.00
Selfish mother	0.45	0.05	0.41	0.00
Unclassified social preference child	0.26	0.06	0.19	0.00
Unclassified social preference father	0.23	0.02	0.22	0.00
Unclassified social preference mother	0.28	0.04	0.25	0.00
Number of families	431	111		

Table 14: Determinants of families belonging to Cluster 2 (impatient, risk averse, and spiteful), depending upon parents' background characteristics – probit regression

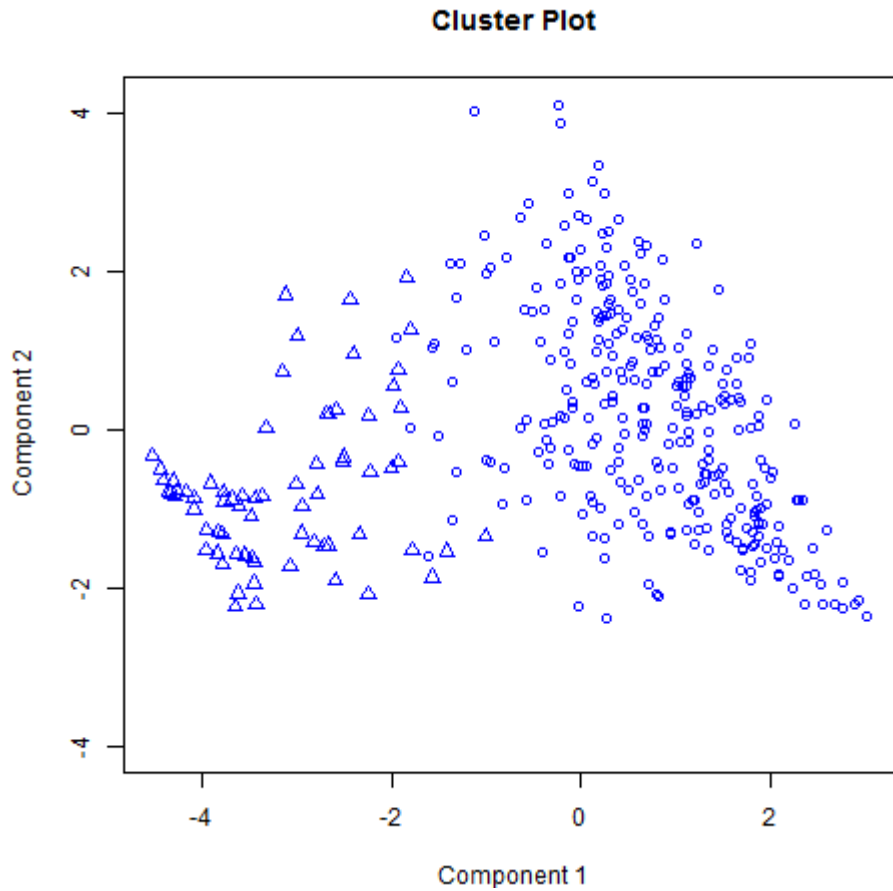
	marginal effects at mean	Std. Error
Per capita income per month in 2016 x 10 ⁻⁴	-0.026**	0.012
Household size	-0.028**	0.014
Age father (in years)	0.005	0.003
Age mother (in years)	-0.000	0.004
Schooling father (in years)	0.004	0.006
Schooling mother (in years)	0.016**	0.007
Full scale IQ father (standardized)	0.008	0.024
Full scale IQ mother (standardized)	0.034	0.024
Number of observations	538	

Pseudo-R² = 0.067

Log-likelihood = -255.57

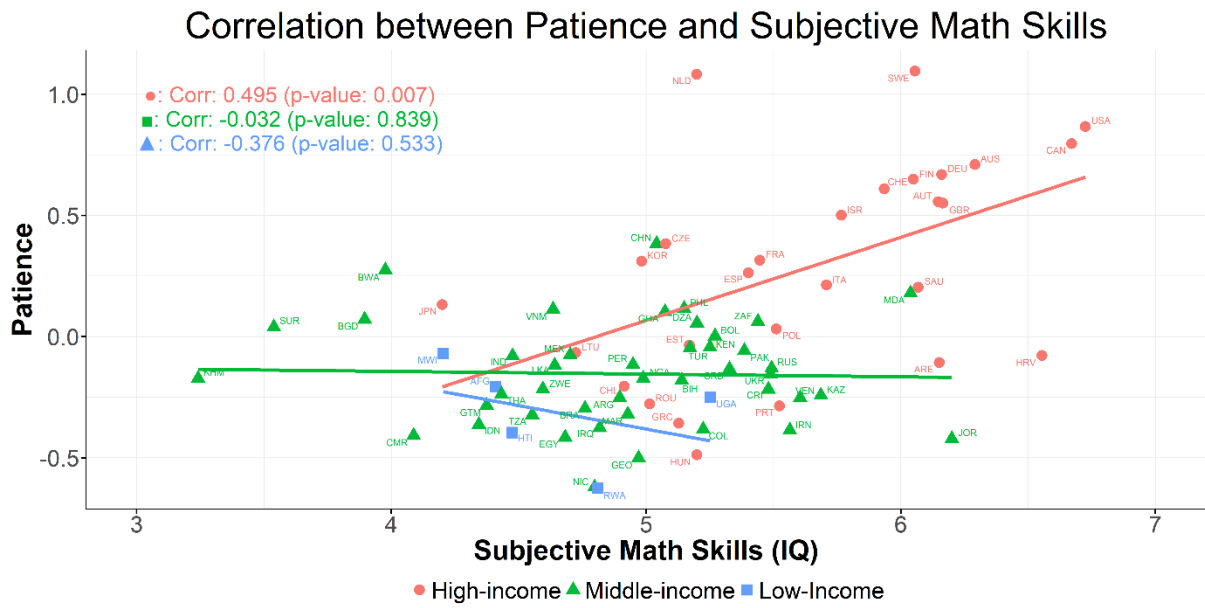
*** p<0.01, ** p<0.05, * p<0.1

Figure 1: The two family clusters dependent on two factors from a principal component analysis of economic preferences



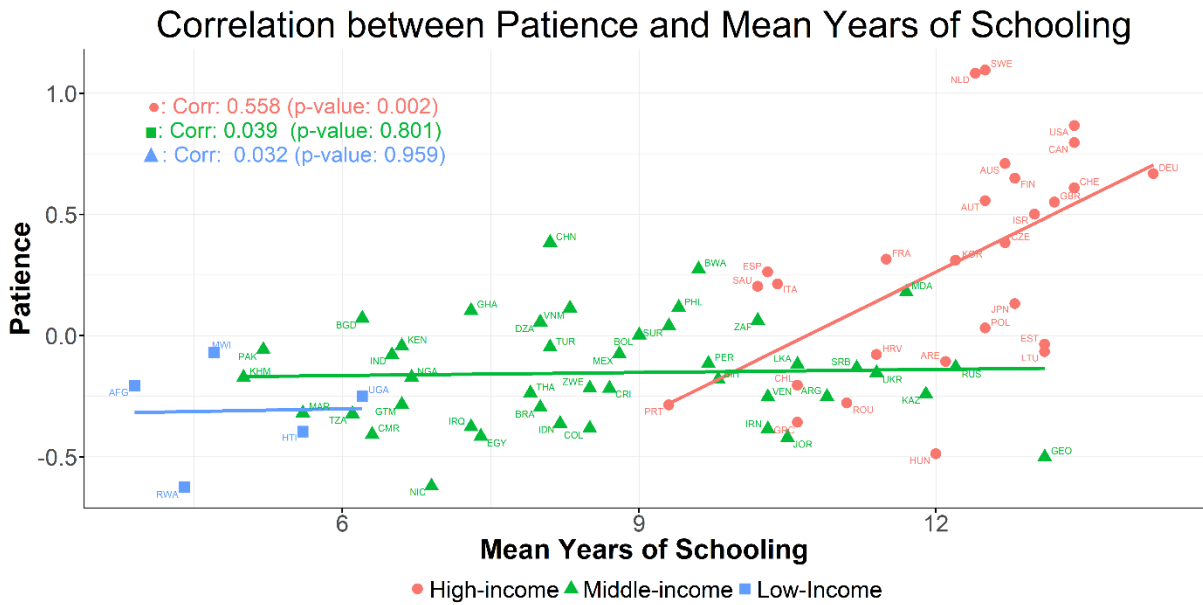
Circles indicate families that are assigned to Cluster 1, triangles represent families assigned to Cluster 2. Component 1 on the horizontal axis can be interpreted as a factor capturing spitefulness, risk and time preferences. Negative values represent more spiteful, risk averse and impatient families, positive values less spiteful, more risk tolerant and more patient families. Component 2 (the other factor with a loading larger than one) has no straightforward interpretation.

Figure 2: Relationship between IQ and patience, conditional on income level of country



We show on the vertical axis the average level of patience in a particular country and on the horizontal axis the average level of math skills as a proxy for IQ (both taken from the Global Preference Survey; Falk et al., 2018). The income classification is taken from the World Bank (see <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519>).

Figure 3: Relationship between years of schooling and patience, conditional on income level of country



We show on the vertical axis the average level of patience in a particular country (from the Global Preference Survey; Falk et al., 2018) and on the horizontal axis the mean years of schooling (from the United Nations Development Program; <http://hdr.undp.org/en/indicators/103006>). The income classification is taken from the World Bank (<https://datahelpdesk.worldbank.org/knowledgebase/articles/906519>).